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CONTENTS

PAGE

1. PRIVATE FREIGHT CARS AND AMERICAN RAILWAYS—*L. D. H. Weld, Ph.D.* 1

2. OHIO BEFORE 1850—*Robert E. Chaddock, Ph.D.* 187

3. CONSANGUINEOUS MARRIAGES IN THE AMERICAN POPULATION —*George B. Louis Arner, Ph.D.* 343

4. ADOLPHE QUETELET AS STATISTICIAN—*Frank H. Hankins, Ph.D.* 443

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STUDIES IN HISTORY, ECONOMICS AND PUBLIC LAW

EDITED BY THE FACULTY OF POLITICAL SCIENCE OF
COLUMBIA UNIVERSITY

Volume XXXI] [Number 1

PRIVATE FREIGHT CARS
AND
AMERICAN RAILWAYS

BY

L. D. H. WELD, Ph.D.
Garth Fellow in Political Economy

New York
COLUMBIA UNIVERSITY
LONGMANS, GREEN & CO., AGENTS
LONDON: P. S. KING & SON
1908

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kindly given much of their time. I am indebted to Professor David Kinley, under whose direction I completed the first part of my work, to Professor B. H. Meyer, who read critically a large part of my manuscript, and to Professor Edwin R. A. Seligman, whose interest, criticisms, and suggestions have been of great value. Professor H. R. Seager has also been kind enough to correct the manuscript and read the proof. I am also indebted to the Carnegie Institution for an appropriation to aid me in my investigations.

Louis D. H. Weld.

Columbia University, *March, 1908.*

CONTENTS

PAGE
INTRODUCTION 9

CHAPTER I

HISTORY OF SPECIAL EQUIPMENT CARS

Refrigerator cars 11
Development of the principal lines 16
Early history of stock cars 20
Early history of tank cars 23
The number of private cars 26
Development of railroad ownership of refrigerator and stock cars . 27
Construction and operation of refrigerator cars 31

CHAPTER II

THE PART THAT EQUIPMENT CARS HAVE PLAYED IN THE DEVELOPMENT OF THE COUNTRY

Effect on beef-packing industry 44
Effect on agriculture 46
The fruit traffic:
    In California 47
    In Georgia 51
    In Michigan 53
Vegetable traffic 58
Traffic in dairy products 64
Effect on prices of agricultural products 65

CHAPTER III

FINANCIAL RELATIONS BETWEEN PRIVATE-CAR LINES AND THE RAILROADS

The public-highway theory 72
Fast-freight lines 75
History of mileage rentals 78
Present mileage rentals 89

CHAPTER IV

CONTRACTS BETWEEN PRIVATE-CAR COMPANIES AND THE RAILROADS

Simple agreements as to mileage rental, freight rate and amount of traffic 92

PAGE

Contracts in which railroads pay a commission on the freight rate to the car companies 93

Exclusive contracts:
  Objections to 95
  Arguments in favor of 102
  Conclusions 110

CHAPTER V

Refrigeration Charges

Reduction of refrigeration charges since first imposed 114
Icing charges in Michigan 117
Icing charges in California 123
Icing charges in Georgia 128

CHAPTER VI

Earnings of Private Cars

Earnings during the nineties 137
The average mileage rental of refrigerator cars 140
The average daily mileage 141
Cost of cars 142
Expenses of operation 143
Earnings of dressed-beef cars 144
Earnings of other refrigerator cars 147
Earnings of stock cars 152
Earnings of tank cars 153
Conclusions as to earnings 156

CHAPTER VII

Discriminations and Rebates

Discriminations from excessive mileage payments 160
Rebates paid in the fruit traffic 163
The case of the Milwaukee Refrigerator Transit Company 165
Discriminations at present 167

CHAPTER VIII

Proposed Remedies and Present Tendencies

Abolition of private cars 170
Formation of an equipment company 173
Per diem basis for private cars 175
Extension of government control 177
Effect of recent legislation 180
The outlook for private cars 183

INTRODUCTION

Recent events have brought private freight-car lines into unpleasant prominence. Popular articles have been written denouncing the evil practices of the companies owning such cars. The Interstate Commerce Commission has investigated these companies, holding special hearings for the purpose, and the Committees on Interstate Commerce of the Senate and House of Representatives have received testimony in regard to them. The principal alleged abuse which has given rise to agitation against privately owned cars has been the icing charges of certain powerful companies operating refrigerator cars, and it is about this type of car that the controversy has thus far largely centered. Private companies also own cars built to carry cattle, oil, coal, furniture, and many other commodities, which differ in important respects from the majority of the freight cars owned by the railroads, although the railroads, too, now own many cars of special design. Private freight cars are usually, therefore, cars built to carry particular kinds of commodities. Box cars and flat cars are thus eliminated, and, although coal cars come under this description, they will not be treated to any extent in this monograph. It will be convenient to refer to such cars in future as special-equipment cars.

It is difficult in some cases to draw the line between railroad ownership and private ownership. In general, it may be said that the status of a special-equipment car falls under one of three heads: first, it may be owned outright by a

railroad; second, it may be owned by a separate corporation, but with the stock of that corporation owned or controlled by a railroad; or third, it may be owned by a person or company entirely independent of any railroad. It is when a car comes under this last heading that it is strictly speaking, a private car. Those owned by subsidiary corporations of railroads are operated in the majority of cases as if owned directly, and are therefore considered as railroad-owned cars. The difficulty in determining whether or not a car should be classified as a private car arises from the fact that it is not always plain whether the corporation owning the car is in turn owned by a railroad. This is especially true in the case of coal cars.

To understand the private-car situation, it is necessary to make a study of the development of the principal kinds of special-equipment cars which are commonly owned by private companies. These are refrigerator, stock and tank cars. It will be noticed that the refrigerator car is treated more fully than the others, because, as has just been remarked, the present agitation has centered around this type, and also because it greatly outnumbers either of the other kinds. The part that special-equipment cars have played in the development of the country will also be treated almost exclusively in connection with the refrigerator car.

CHAPTER I

HISTORY OF SPECIAL-EQUIPMENT CARS

REFRIGERATOR CARS

THE early history of refrigerator cars is somewhat obscure. There are no statistics to show the number owned by private companies over a series of years, and it is impossible to enumerate them exactly even at the present time. There are conflicting statements as to which was the first refrigerator car used, and attempts that have been made to write up this history have had to be based more on the recollection of men who were alive at the time when refrigeration in transit was first introduced, than on any definite and authentic records.

Probably the earliest attempts to refrigerate freight cars were made on the Michigan Central Railroad in the early sixties for the carriage of fresh meat from Chicago to New York and Boston.[1] Ordinary box cars were fitted with platforms at each end, about three feet from the floor, with metal catch-basins to carry away the melted ice, and heavy swing doors were suspended from the ceiling to hold the ice in place. These bins held from 2000 to 3000 pounds of block ice, and the ice could be placed in the car only when it was empty. A metal pipe carried the waste from the catch-basin through the bottom of the car. These were crude affairs, and can hardly be called refrigerator cars; but by carrying

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[1] *Ice and Refrigeration*, September, 1904, p. 165.

them on passenger trains as far as Suspension Bridge, N. Y., and there attaching them to fast freight trains, the railroads were able to land them in New York in about three days with the meat in good order. These attempts did not attract much attention, and were not successful enough to give any idea of the vast change that was soon to be brought about by the use of the more efficient refrigerator cars.

At about the same time, the Pennsylvania Railroad was also experimenting in refrigeration under the direction of W. W. Chandler, who was for years at the head of the Star Union Line, and who did more than any other man to further the early development of this kind of traffic. It was about 1857 that Mr. Chandler had thirty box cars refitted with double sides, roof, and floors, and the interstices packed with saw-dust, and thus hatched what the present officers of the company claim to have been the first refrigerator cars. These cars had a hole in the floor between the doors for the leakage of ice water, and a box of ice was put in the door after the car was loaded. Mr. Chandler called this the " ice box on wheels," and it was used for the carriage of dairy products from the West. This car was soon improved by placing the ice in huge boxes hanging by iron straps in the ends of the car.

At about the same time that Chandler was instituting refrigeration in transit over the Pennsylvania, experiments were going on in Detroit in order to perfect a more efficient car. The first patent taken out for a refrigerator car was that of J. B. Sutherland, of Detroit, Michigan, under date of November 27, 1867.[1] In 1868 Mr. D. W. Davis, of Detroit, who had been experimenting since 1865, patented his improved refrigerator car, and this was one of

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[1] **W. A. Taylor**, *Yearbook of Department of Agriculture*, **1900, p. 574.**

the most widely used of the very early cars. A successful shipment of dressed beef from Chicago to Boston in September, 1869, in this car, may be said to be the real beginning of the dressed-beef industry. The Davis car came into competition with the car invented by Chandler on the Pennsylvania Lines, and present officials of the Star Union Line remember how they used to characterize the Davis car as a "sweat box," a description justified by the fact that the old Davis car had no adequate means of ventilation.

The first attempts to refrigerate fruit in transit were probably those made in 1866 by Mr. Parker Earle, then residing in Cobden, Illinois.[1] In that year he built twelve big refrigerator chests for shipping strawberries by express. Each chest held 200 quarts of berries and 100 pounds of ice. When taken good care of, the berries carried well, but on account of carelessness in handling, and excessive express rates, this method had to be abandoned. Similar attempts were made about this time in the shipping of fruit from Charleston, S. C., to New York by steamer, and Georgia shipped her first peaches to distant markets by express in 1877. In 1868 a Davis car was brought to Cobden, Ill., and loaded with strawberries. The car contained a vertical cylinder in each corner, about fifteen inches in diameter, and was iced from the top of the car, salt being mixed with the ice. The result of this experiment was that part of the berries were frozen, while the balance of the load was unequally cooled. The shippers suffered a loss, and did not feel encouraged to try it again. In the same year,[2] two carloads of Michigan peaches were shipped to New York in cars used on the Michigan Central for carrying meat.

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[1] F. S. Earle, *Yearbook of Department of Agriculture*, 1900, p. 444.

[2] Taylor, *op. cit.*, p. 574.

When they reached Suspension Bridge, N. Y., the cars were opened, and it was found that the heat thrown off by the ripening peaches had melted the ice, and that the fruit had spoiled, entailing a loss of over $1,000 per car. The failure was due to the warmth of the fruit when shipped and to the lack of re-icing facilities en route.

In 1869 another carload of strawberries was shipped by Mr. Earle and other fruit growers, from Cobden to Detroit in one of the Michigan Central cars. The ice melted in transit, owing to the removal of the plugs from the ice boxes in the roof by some railroad official in order to give the berries "a chance for a little air." When the car reached Mr. Earle, who had gone ahead to Detroit to make sure of a market, the berries were ruined, and the venture was a total loss.

Mr. Earle, however, continued his experiments, and built a cooling house in his packing shed at Anna, Ill. By leaving his berries in this house for twenty-four hours to cool off, and then sending them to Chicago by express, he found that they arrived in much better condition than those which were sent as soon as picked. He then went to Chicago and procured what was then the best refrigerator car that had been made,—the old Tiffany car, built to carry dairy products,—with a V-shaped ice box suspended from the roof and running the full length of the car, holding a maximum of a ton and a half of ice. After cooling the berries in the cooling house, they were placed in this car, and sent to Chicago. The venture was a complete success from the start, and resulted in placing on the Chicago market more solid and better-keeping berries than had ever before been seen there. The date of this first successful shipment was 1872. This car, built for dairy products, however, was not very satisfactory on account of its small ice capacity.

What was needed was a car that would hold four or five tons of ice, so that the warm fruit could be cooled in the car, and then taken on a two or three day trip with safety. Mr. Earle soon had such a car built,—one that was well insulated and with adequate ice capacity.

It was not until some time after this that fruit or vegetable shipments were made over any great distance, and the Middle West and West were ahead of the East in the development of this traffic. Some of the initial shipments under refrigeration from districts that have since become important and well known were:[1] first shipment of garden-truck from Norfolk, Va., to New York City, 1885, and from North Carolina, 1887; first shipment of strawberries from California to New York, 1888; first car-load of oranges from California to the East, 1888; first car-load of oranges from Florida to New York, 1889. Shipments had been made in ventilator cars before these dates.

The introduction of refrigerator cars was accomplished in the face of much skepticism and opposition on the part of both the growers and the traders. It was generally believed that when fruit had been on ice, it would decay rapidly after being taken off. This is true of fruit that is over-ripe before being placed on ice, though not true of fresh fruit if properly handled, but it took many demonstrations to induce growers to believe this. The use of refrigerator cars consequently increased but slowly at first, and it was not until some time later that even the experimental stage was passed. Mr. Armour, in his book, *The Packers, The Private Car Lines, and The People*,[2] tells us that Mr. Hammond of Detroit was one of the pioneers in the use of the refrigerator car for the carrying of meat products, and that

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[1] *Twelfth Census of the United States*, vol. v.

[2] Page 20.

his first successful attempt was in 1871. In this car, the meat came in contact with ice, became discolored, and did not keep well after being removed. To obviate this difficulty, the meat was suspended from the rafters and ceiling, but the motion of the cars in going around curves set the halves of meat swinging like pendulums, so that this motion was communicated to the cars. Some railroad wrecks were attributed to this cause, and the hostility of the railroads was aroused. Then came the partitioning-off of an ice bin at the end of the car, and later the true principle of refrigeration was discovered: that a current of air allowed to pass through an ice bunker in the upper corner of a car becomes chilled so that it is heavier than the air with which it comes in contact, and consequently sinks, circulates through the car, the warm air passing out through the ventilator. It was not until this system was adopted that refrigerator cars came into at all general use, and that refrigerator lines which could handle any extensive business were established. We shall now glance at the early history of some of these first lines, and see why they were built by private concerns and not by the railroads.

By the year 1870 there were powerful vested interests shipping live cattle from Chicago and other western points to the East. There were important stockyards at Cleveland, Buffalo, Albany, Pittsburg, Boston, and several other intermediate places where cattle were unloaded, fed and watered, and reloaded. These people were naturally strongly opposed to the development of the dressed-beef traffic and the consequent decline of cattle shipping. The dressed beef that was carried over the Michigan Central was insignificant in amount, and the business was not receiving encouragement nor being developed. Mr. Gustavus Swift was the first to inaugurate an adequate refrigerator service for carrying dressed meats, and the first to demonstrate

what could be done.[1] In 1875 he began by experimenting with a few carloads, supervising the work personally. After finding some one to handle his shipments in the East, he started in to do business on a large scale,—an undertaking at that time very bold and hazardous. He approached the Grand Trunk Railroad, whose route was so circuitous that it did not handle much livestock and which consequently was not opposed to the development of the fresh meat traffic, and suggested that it build refrigerator cars for the purpose. Mr. Swift was informed that the road would be glad to handle the cars, but that it was unwilling to build such equipment. The railroad claimed that it was too experimental a business, and that it could not afford to build the costly cars required. Mr. Swift was therefore thrown upon his own resources, and it was necessary for him to build his own refrigerators if he wished to carry out the gigantic project of developing an extensive market for dressed beef in the East. This instance is noteworthy, for it, with many such refusals of railroads to build cars, explains the reason for the early private ownership of special-equipment cars. Armour, in his book, recounts the same experience when his father started in to ship dressed beef;[2] the railroad men themselves admit that they refused at first to build such equipment. There is, then, no doubt that private ownership of special-equipment cars originated largely because of the refusal of the railroads to build them. The early development of traffic in perishable goods was thus due to private companies, and not to the railroads.

To return to the work of Mr. Swift. He went to Detroit and ordered ten refrigerator cars of the latest and most satisfactory type, and began shipping beef both summer

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[1] Charles Winans, *The Evolution of a Vast Industry.*

[2] Armour, *op. cit*, p. 22.

and winter over the Grand Trunk. He soon added to his equipment and has gradually increased it until now his company operates over 6000 cars. The consequent changes in the meat and livestock industries will be studied in another place. The other refrigerator-car lines built by Armour and Nelson Morris soon followed, as also those belonging to Cudahy, and Schwarzschild and Sulzberger. These cars were built for carrying beef.

The first refrigerator line of any importance operated solely for the fruit traffic was that of F. A. Thomas, a fruit and produce dealer of South Water Street, Chicago. His line was started in the following way.[1] A Detroit inventor named Carlton B. Hutchins perfected a refrigerator car in 1886, had fifty of them built, organized the Detroit Refrigerator Car Company, and operated them over the Michigan Central in the fruit and produce trade. Owing to a personal disagreement with the president of the road, Mr. Hutchins was obliged to cease operating his cars over the Michigan Central, and went to Chicago in search of some one who would use them. There he found Mr. Thomas and his son, who took them, and operated them in traffic to the East. In a few months Mr. Thomas prevailed upon the roads running to the Pacific coast to let him send five cars to California to test carrying fruit from there to Chicago. The fruit growers were skeptical and would not allow their fruit to be shipped in these cars, so the Thomas firm had to buy the fruit with which to load them.[2] The experiment was successful, and the possibilities in the development of this traffic were immediately realized. This

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[1] Russell, *Everybody's Magazine*, March, 1905, p. 296. (I am informed by railroad men of Chicago who were in a position to know at the time, that Mr. Russell's early history is authentic.)

[2] J. C. Scales in *Saturday Evening Post*, March 10, 1906.

was in 1888. Soon the Thomases, together with Mr. Hutchins, formed the California Fruit Transportation Company, (known as the C. F. T.), which rented cars of the Hutchins Refrigerator Car Company, a corporation which had been formed for the purpose of building and owning the cars, for $8.33 a month each. This company operated for a couple of years at enormous profits and its success allured others into the field. Soon the Goodell Line, owned by Porter Brothers, began in the California trade, and then came the Continental Fruit Express (known as the C. F. X.), owned by Mr. Edwin T. Earl. It was about this time (1890), that Armour became interested in the fruit traffic, and it is alleged that Earl got his first refrigerators from him.[1] At any rate, there soon ensued a fierce competition for the traffic, and cut rates and rebates were granted indiscriminately. Armour became allied with Porter Brothers, and later absorbed that company. The relations between Armour and this company were investigated in the Interstate Commerce Commission hearing of October, 1904.

The cutting of rates was carried to such an extent that the Thomas Company became embarrassed, and after a few futile efforts to maintain its business, it was forced to the wall. The C. F. T. was later absorbed by Swift, and is now one of the lines operated by him. Not long after this, the Earl Company, C. F. X., was bought out by Armour at a high price, for this company had increased its equipment and business and had not been driven to the wall under the stress of competition. After this, the fruits of California were carried mainly in Armour cars, until late in the nineties when the Santa Fe began to build an adequate supply of refrigerators.

As stated above, it was not until about 1890 that Armour

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[1] Russell, *Everybody's Magazine*, March, 1906.

became interested in the fruit traffic. Previous to that time his refrigerator-car equipment was used only in hauling dressed meats. He began by building 1000 cars for the carriage of fruits and vegetables, and sent men into the fruit-growing sections of the country to demonstrate the practicability of his cars and to solicit business. The traffic developed, and he soon built another thousand cars. By building its own cars, and by acquiring the cars of other companies, the Armour Car Lines soon became the most powerful company in the business. The equipment of some fifteen to twenty different concerns, some of them very small, have been purchased by the Armour Company from first to last, but they now operate principally under the following names: Armour Car Lines (in the meat traffic), Fruit Growers' Express, and the Continental Fruit Express.

EARLY HISTORY OF STOCK CARS

Ordinary stock cars were owned by the railroads at a very early date, and there is nothing of particular interest about their origin. They are not so expensive to build as refrigerator cars, nor do they require the same careful supervision and constant care. Some stock cars were owned by private individuals early in the seventies.[1] Lansing Millis of Boston, and later Squires and Company of the same city were among the first to enter this field, shipping horses, cattle, and hogs, from the Mississippi to the Atlantic seaboard. Subsequently they sold their cars to the Central Vermont Railroad. The common method of caring for live cattle in transit, as has been explained above, was to remove them from the cars at intermediate points where there were yards, there to feed and water them, and then

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[1] Midgley, *Railway Age*, vol. 34, p. 368.

reload them. For this, the railroads claimed that their equipment was adequate, and opposed the private ownership of such cars. It was not until improvements were introduced, which the railroads were slow in adopting, that private companies began to own cars to any extent.

In 1883 an exposition of railroad appliances under the direction of Mr. E. H. Talbot, then president of the *Railway Age,* was held in Chicago. At this exposition, which was well attended by railroad men, there were exhibited models of stable cars, or "palace live-stock cars" for the better care of horses, cattle, sheep and hogs during transportation. These contained racks and troughs from which the cattle could be fed and watered in transit, and also moveable partitions which allowed the animals to lie down without danger of being trampled on. The Street stable car, the Burton stock car, and the Mather stock car, which are commonly seen on the railroads today, were among those exhibited. The part that Mr. A. C. Mather, the originator of the last-named car, played in the installation of this improved and more humane method of live-stock transportation is most interestingly told by himself in an article in the *Railway Age,* for October 16, 1903.

Mr. Mather's interest in the improvement of transportation conditions for livestock began in 1881, through an experience he had on a journey East. His train was held up for twelve hours on account of a wreck, and from his car window he could see in one car of a stock train which had been many days en route, five dead, and several maimed and bruised steers, caused by the efforts of one powerful animal to work his way from one end of the car to the other in obedience to his natural instinct to search for food and water. Mr. Mather resolved to design a car which would do away with these conditions. In a short time he obtained a patent and went to the railroads, actuated at first

by purely humane motives. Although he spent hundreds of dollars in traveling, he could not get the railroads to build improved cars, alleging that they had no money to put into experiments. Not to be daunted, he set about building a car of his own, which cost him nearly $10,000 before he had perfected it so as to stand the heavy wear and tear to which it would be subjected. By a series of careful, personally-conducted experiments he demonstrated the efficiency of his car, not only from a humanitarian, but also from a commercial standpoint, because the shrinkage en route was shown to be substantially less than in the common railroad stock cars. Again he approached the railroads, but was met with the same refusal to build the equipment. They also told him that if he wished to build cars of his own, they would pay him the regular three-quarters of a cent mileage. Accordingly, he organized a company, and succeeded in raising money enough to finance the enterprise. This was the origin of the Mather Stock Car Company. As a reward for his successful experiments, Mr. Mather was awarded a gold medal by the American Humane Society in 1883.

Although it was claimed by Mr. Mather and the other owners of these improved cars that their use saved a considerable amount in shrinkage of livestock, some railroad men denied that there was any appreciable saving. Many tests were made and a select committee of the United States Senate, which took testimony on the transporation and sale of meat products in 1889, inquired into the matter. One man, representing the American Live-Stock Express Company,[1] testified that the shrinkage common in ordinary stock cars was diminished 65% by the use of the palace cars of his company. (The shrinkage in ordinary stock cars was

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[1] Testimony of B. F. Holmes, p. 559; testimony of J. B. Dutcher, p. 588.

about 8 or 10 per cent of the total weight of animals during transportation for 2000 miles). At any rate, it was generally believed,—and there was other good evidence to bear out this belief,— that there was a great saving from the use of the improved cars. They were built with lighter springs, and it was testified that they were as well equipped with wheels, brakes, and couplers, as Pullman cars, and there were often allusions to the furnishing of "Pullman cars for the transportation of cattle." By 1889 there were seven companies owning and operating stable cars.[1] The number of companies has not increased to any extent, although many of the old ones are still in business and have added materially to their equipment. The number of stock cars, however, owned by private companies, is now unimportant as compared with the number owned by the railroads, and there have not been the objections to their use that there have been to the use of refrigerator cars.

HISTORY OF TANK CARS

Simultaneously with the introduction of improved cattle cars, came improved methods for the transportation of petroleum and its products. The ordinary way to ship oil was in barrels, which were loaded into ordinary box cars. The barrels often leaked, the cars became saturated with oil, offensive, and likely to take fire.[2] For these reasons, cars with large iron tanks cylindrical in shape, were introduced, into which the oil was run in bulk from reservoirs at stations where the refined product was collected. Only large establishments could afford to provide such expensive equip-

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[1] Street Stable Car Co., American Live Stock Express, American Live Stock Transportation Company, Burton Car Company, Delaware and Lackawanna Live Stock Line, Canda Cattle Car Co., Mathews Car Company: *Hearing on Transportation and Sale of Meat Products*, p. 56.

[2] Midgley, *Railway Age*, vol. 34, p. 369.

ment, and since the freight rate on oil carried in tank cars was lower than on that carried in barrels, the ownership of cars was a distinct advantage to the large shippers. Furthermore, the owners of these cars refused to lease them to other companies, and the railroads would not supply equipment of their own, and never have done so to any extent even to the present day. The Standard Oil Company created a subsidiary concern,—The Union Tank Line Co.,—which built and handled tank cars, and which has always been the most important company operating such cars. It now owns about 10,000 of them.

On account of the advantage obtained by the large producers in owning tank cars, and especially because of the lower freight rate for oil carried in tanks, there was widespread opposition to their use. The Interstate Commerce Commission, in considering this question, stated that it was the duty of the railroads to provide equipment for their patrons, and that failure on the part of shippers to own such equipment should not result in a discrimination in rates against them. As a result of this decision,[1] the rates on oil in barrels were lowered, and those on oil in tanks were raised,—but this only partially diminished the discrimination in favor of the large shipper, and so the opposition continued.

Another ground for dissatisfaction on the part of the small refiner was that the rate on oil in tanks was on only the oil itself, while in the case of that shipped in barrels, the weight of the barrels was included in the charge. Commenting on this, the Commission declared that the tanks were as much a package for the carrying of oil as the barrel was, and that the practice of not charging for the weight of the tank was therefore an unjust discrimination. In ac-

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[1] Midgley, *Railway Age*, vol. 34, p. 400.

cordance with opinions of this sort many complaints were filed by independent oil companies against certain railroads, alleging violation of the Interstate Commerce Act. The oil cases, as considered by the Interstate Commerce Commission are to be found in the first six volumes of its reports. This early history of oil transportation is ably told by Mr. J. W. Midgley, who was himself personally active in the controversy, and in the attempts made by the railroads to reduce the mileage paid to tank cars, in his articles in the *Railway Age*.[1] These attempts were eminently unsuccessful, and are only another evidence of the power that the Standard Oil Company had over the railroads.

An interesting item in connection with this controversy with the Union Tank Line Company was an offer made by that Company to the railroads either that they buy the equipment of the company outright or that the company turn over its equipment to the railroads to operate, in return for which the company was to receive interest on the appraised value of the cars, plus a mileage of six mills per mile to cover expenses for repairs, *etc.* The second proposition was dismissed at once; the first was considered, but soon dismissed also. This is of interest, because one possible solution of the private-car question lies in this direction of ownership of special-equipment cars by the railroads, a point which we shall consider later on. It may be well, however, to remark in passing that the fact that the Union Tank Line was willing to sell its equipment to the railroads may be considered as evidence that the company was not making any large profits,—and it has since been brought out in the Interstate Commerce Hearings that the company has actually operated at a loss some of the time.[2]

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[1] Midgley, *Railway Age*, vol. 34, p. 401.

[2] *Interstate Commerce Commission Hearings*, October, 1904, p. 219. (This will hereafter be referred to as I. C. C., Oct., 1904, *Hearings*.)

NUMBER OF PRIVATE CARS

As has been said before, the exact number of privately owned cars in the country is impossible to determine, and all estimates are necessarily only approximate on account of the failure of many companies to make reports as to the equipment owned and operated by them. The *Railway Equipment Register* furnishes the most complete statement of the different companies, with the number and description of their cars. Various estimates have been made: in 1900 attorneys for the Continental Fruit Express Company stated that the aggregate number of private cars in the country was about 113,000, of which 50,000 were refrigerator cars.[1] The estimate made by Mr. J. W. Midgley in the *Railway Age* for October 10, 1902, is probably the most accurate, but it is six years old. His estimate of the number of cars, together with their value is here given:

Kind of Cars.	*Number.*	*Value per Car.*	*Total Value.*
Refrigerator	54,522	$800	$43,617,600
Box	21,178	500	10,589,000
Tank	14,531	600	8,718,600
Stock	11,139	600	6,683,400
Coal	16,143	500	8,071.500
Flat	853	450	383,850
Furniture and vehicle	1,533	600	919,800
Poultry	325	800	260,000
Unclassified	10,622	500	5,311,000
Total	130,846		$84,554.750

In 1906 the number of private cars enumerated in the *Railway Equipment Register* (July, 1906), as nearly as can be told from the nature of the reports therein, was

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[1] Brief and argument for the Continental Fruit Express Co., Intervenor in Southern California Fruit Exchange *vs.* Southern Pacific, Santa Fe *et al.*, tried before Interstate Commerce Commission, March 30, 31, 1900.

about 127,000. Some lines are omitted from this, however, as for instance most of the Armour lines, the Continental Fruit Express, owning 1745 cars, being the only Armour line included in the *Register*. This alone involves an omission of about 12,000 cars, and by adding 10,000 more for other possible omissions, we have about 150,000 cars, probably not far from the actual number in the country at present. The total number of freight cars owned by the railroads in 1905 was 1,692,194, or a little over ten times the number of private cars.

DEVELOPMENT OF RAILROAD OWNERSHIP OF REFRIGERATOR AND STOCK CARS

One thing to be noticed particularly in connection with the development of special-equipment cars is that it has been comparatively recent. In fact not until the later eighties were such cars numerous enough to play any important part in the railroad problems of the day. The ordinary stock cars were owned and used by the railroads at an early date. The palace stock cars, however, were not used until the eighties, and these were the ones which were owned by private companies. We have seen that refrigerator cars were generally owned at first by private companies, and that it was not until about 1890 that there were any important lines which carried perishable products besides beef. The development of refrigerator cars has thus taken place only within the last fifteen or twenty years, and, in fact, the traffic in perishable goods may be considered as still in its infancy.

Although the railroads at first refused to furnish refrigerator equipment of their own, it was not long before certain roads, which covered extensive sections of the country, and which had a diversity of climatic conditions along their lines, began on a small scale to build such cars. In 1885 the total number of refrigerator cars owned by the railroads of

the country was almost exactly 1000. Such roads as the Illinois Central, Missouri Pacific, Louisville and Nashville, and the Union Pacific were among the pioneers in this development, and the largest number that was returned by any one road in 1885 was 162, owned by the Illinois Central.[1]

Mention should be made here of the old-fashioned ventilator or fruit cars. These had openings on the sides and ends, covered with wire screens or overlapping boards with spaces through which the air could pass. They were built especially during the eighties and early nineties for the purpose of carrying fruit and vegetables. Many of them are seen on the railroads today, but generally in a dilapidated condition, for they are being rapidly replaced by the more efficient refrigerator cars, and very few have been built during the last few years. They were of no value in winter, when there is as much need to keep perishable freight warm, as there is in summer to keep it cool. Furthermore, they could not reduce the temperature of a car below that outside, and they were only valuable in providing fresh air for the contents of the car and in allowing the warm air caused by the ripening fruit to escape while the car was in motion.

To return to the question of railroad ownership of refrigerator cars, the growth of their number is shown in the following table, based on figures compiled from Poor's *Manual*:

Year.	*No. of Cars.*
1885	990
1890	3,398
1895	7,043
1900	10,760
1905	24,570

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[1] Figures taken from Poor's *Manual*.

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From this table it will be seen that the increase has been continuous and very rapid, especially since 1900. Prior to that date no particular attention was given by the railroads to this branch of their business, nor were their refrigerator cars subjected to any special supervision. In 1900, the Chicago, Burlington and Quincy organized a separate refrigerator-car division,—a part of the traffic department,—and placed an able man at the head of it to study conditions, to provide for the proper carriage of perishable products originating along the lines of the road, and to stimulate the production of such goods. The organization of this separate department was made more or less as an experiment, there being some doubt whether it would pay. As a result, however, the tonnage of perishable freight increased almost 100 per cent in three years,[1] and the creation of the department was soon justified. Other roads soon realized the possibilities in this direction and organized similar departments. The Santa Fe has until recently owned the largest number of cars, about 6000, operating them under the name of the Santa Fe Refrigerator Despatch Company.[2] During the year 1906 the Harriman Lines ordered 6600 refrigerator cars and organized a separate department to operate them, known as the Pacific Fruit Express, and this has displaced Armour cars on the Southern Pacific and Union Pacific roads. This fact is significant, in that it illustrates the tendency that there is today for railroads to own their own equipment. The reasons why a separate department should have charge of refrigerator equipment are: first, the traffic department is too busy in trying to increase tonnage

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[1] *Railway Age*, Jan. 30, 1905.

[2] This company is really a separate corporation, but is so closely allied with the Santa Fe Railroad that it may be considered as a department of it.

to undertake to look after the special service necessary in the handling of perishable traffic; second, it is requisite to have some one study conditions along the line so as to be able to anticipate the moving of fruits by having cars provided; and third, the icing of cars, the location of icing plants, *etc.*, call for careful study and supervision.

Another method of railroad ownership of refrigerator cars is through the formation of a separate company, the stock of which is owned by the railroads, but which operates over certain lines as a distinct organization. These cars, although not bearing the name of any particular railroad, should not be classed with private cars. The two best examples of this are the American Refrigerator Transit Company, and the Merchants' Despatch Transportation Company. The American Refrigerator Transit Company [1] (commonly known as the A. R. T.), originated as a private company which operated over the Wabash and Missouri Pacific Railroads. It was gradually absorbed by these roads so that it became a subsidiary concern of the Gould lines, over which it now operates its 4500 cars. The Merchants' Despatch Transportation Company (known as the M. D. T.), is a fast-freight line belonging to, and operating over the New York Central Lines. Besides owning 4850 refrigerators, this line owns over a thousand ordinary box cars. Seventy of its refrigerators are assigned exclusively to American Express Company service, and are completely equipped for use in passenger trains.

As for the ownership of stock cars by the railroads, the figures for five-year periods are as follows:

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[1] I. C. C., Oct., 1904, *Hearings*, p. 86 *et seq.* *Cf.* also *Hearings of Senate Committee on Interstate Commerce*, May, 1905, vol. iii, p. 278.

Year.	*No. of Cars.*
1885	43,900
1890	54,900
1895	46,150
1900	38,150
1905	44,893

It will be seen that the decade 1890-1900 shows a considerable decrease in the number of stock cars. This is partly accounted for by the changes brought about in the livestock and packing industries through the use of the refrigerator car and the subsequent shifting of the packing centers to the westward. Formerly, cattle were carried to the Atlantic seaboard to be slaughtered, but with the growth of the dressed-meat traffic, the need for cattle cars on the eastern roads diminished. The increase in the number of cars since 1900 is due to the extension of stock raising farther to the west of the packing centers. The effect of these changes on the livestock and dressed-meat industries will be studied later.

CONSTRUCTION AND OPERATION OF REFRIGERATOR CARS

The art of refrigeration has advanced with rapid strides and the use of mechanical refrigeration in cold-storage warehouses, working in conjunction with refrigeration in transit, has had its beneficial effect on the fruit industry. Apples, especially, are thus held in cold storage, in order to keep them in sound condition during the fall and winter. During the early seventies, mechanical refrigeration was used in the packing houses to chill meats before shipment, but it was not until almost 1880 that cold-storage warehouses were built for the storing of fruit. Since that time, the number of such plants has increased, according to an estimate made in 1901, to 600 establishments in which fruits and produce are stored under mechanical refrigeration.[1] By

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[1] Taylor, *Yearbook of Department of Agriculture*, 1900, p. 569. (The number now is probably 1000.)

mechanical refrigeration is meant the cooling process which is based on the principle that an expanding gas absorbs heat. Ammonia gas is chiefly used for this purpose, and by means of careful insulation, and well-constructed plants and machinery, it is possible to maintain definite temperatures for long periods with very slight variation, after the initial heat of the stored product has been absorbed and removed.

The problem of refrigeration in freight cars is a more difficult problem, however, and has not been so satisfactorily solved as in the case of stationary plants. In the first place, no application of mechanical refrigeration has been devised which can be used in cars, and therefore ice has to be used. Other reasons are that the temperature is higher, the moisture greater, the distribution of cold air less uniform, and the refrigerating power less efficient.[1] As we shall see later, these difficulties have not been entirely overcome in the refrigerator car, although great progress has been made.

Nearly 400 patents have been taken out in the United States with a view to improvement in the refrigerator-car service.[2] The patents cover construction, air circulation within the car, ventilation, the capacity and arrangement of ice tanks, mechanical and chemical refrigeration, and various other subjects. Those that have involved any complicated mechanism have proved impracticable, and those that are in use have been selected with a double view to efficiency in refrigeration and adaptability to the requirements of modern railroading. Anything that delays the movement of trains, or that is beyond the skill of the ordinary brakeman to handle, is clearly out of place.

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[1] Powell, *Yearbook of Department of Agriculture*, 1905, p. 356.

[2] G. Harold Powell in a paper read before the American Society of Refrigerating Engineers, New York, Dec. 4, 1905.

The construction of the latest-improved refrigerator cars, in a few words, is as follows: The roof, sides, and floor are built double, and the space is generally filled with felt or heavy paper so as to furnish as perfect insulation as possible. The ice bunkers are at the ends and extend from the top to within a few inches from the bottom of the car. They are filled with ice from the top where there are two openings, or hatches, for each bunker. Underneath the hatches, there is a tight-fitting plug, which, when forced into place renders the passage of air from the outside practically impossible. When a car is running under ventilation, these plugs can be turned so as to drop down into the bunkers, allowing the free passage of air. In this case, the hatches are left open at an angle of about 45° so as to catch the air, and force it into the car. The Mackintosh ventilator, used on the Santa Fe cars, is a V-shaped metal contrivance which can be opened so as to catch the air, and this is an improvement on the commoner method of merely opening the hatches part way.

The bunkers are partitioned off from the end of the car, sometimes by means of a wooden partition with openings about a foot and a half wide at the top and bottom, and sometimes with an iron grating, covered with overlapping strips of metal, allowing the free circulation of air from all parts of the bunker to the rest of the car. This latter device is called the Bohn Patent, and the best cars are now supplied with it. Under each bunker is a catch-basin for the melted ice, and drain pipes carry this waste through the bottom of the car. The bunkers in the best fruit cars together hold about five tons of ice. Those built for the carriage of dairy products and meats have a smaller ice capacity, some of only a ton and a half, and this constitutes the principal difference between the fruit car and the meat car. In those cars having large ice capacity the bunkers

extend in about two and a half or three feet from each end of the car, thus taking up valuable room that might otherwise be used for freight.

In the refrigerator cars in use today, the temperature usually falls to between 40° and 50° F. Perishable fruit is usually loaded into cars direct from the orchard, and its temperature approximates the temperature of the atmosphere. In the South and in the western semi-arid parts of the country it is sometimes loaded at a temperature of 95°. The rapidity with which the temperature of the fruit in the car will fall during transit depends much upon the manner in which the fruit is packed and loaded. If fruit at a temperature of 85° F. is not wrapped, and is placed in fairly open packages,—and if spaces are left between the tiers of packages,—it may cool gradually to between 42° and 50° F. in three days in the bottom of the car. At the same time, the fruit in the top of the car may be 10° warmer.[1] A car of peaches, in which the fruit is wrapped and packed in boxes which are piled closely together, may take twice as long to cool down on account of the insulating effect of the paper and the poorer circulation of air between the boxes. Ordinarily, the temperature in a refrigerator car continues to fall uniformly in transit if the icing is well done. For fruit, block-ice without salt is generally used. In the shipment of meat, it is refrigerated before shipment, and is carried at a temperature ranging from 34° to 40° in transit, the lower temperature being due to the use of broken ice with an addition of about eight or ten per cent of salt.

As we have just seen, the temperature in the upper part of a refrigerator car is generally about ten or fifteen degrees warmer than that in the lower part. As a consequence, the fruit in the upper tiers is sometimes over-ripe when it

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[1] Powell, *Yearbook of the Department of Agriculture*, 1905, p. 356.

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reaches market, while that at the bottom is in sound condition. In fact, cars are not usually loaded to their full capacity, because it does not pay to utilize the warm upper portion. The fruit in ripening throws off a large amount of heat, and no appliances have as yet been devised which insure a circulation of cold air throughout the whole car and carry off the heat caused by the ripening fruit. Since the fruit is hot when loaded, it ordinarily takes from two to five days to reduce the temperature to a degree of cold that retards the ripening and the decay. During these first two or three days, when the car is warm, the ripening springs forward, and since the atmosphere is moist, the rot often begins to grow vigorously.[1] These are fundamental difficulties in the present method of handling fruit for transportation, and have a far-reaching influence on the development of the trade. The extent of the market is limited by the distance that the fruit in the upper part of the car can be safely carried, even though that in the bottom could stand a few more days in transit. A solution of these difficulties would tend to develop more distant domestic, and also foreign markets, and would obviate the difficulty of having to pick hard and unripe fruit which often reaches the market in an insipid and flavorless condition.

The pomological experts of the United States Department of Agriculture have been investigating this phase of the problem and they estimate that the loss from deterioration of fruit during shipment amounts to over a million dollars per annum for the whole country, and to $500,000 in transporting the California orange and lemon crop alone. They have found that this deterioration is due not only to inferior transportation facilities, but also to mechanical bruises received while picking, sorting and packing the

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[1] Powell, *Problems in the Transportation of Fruit.*

fruit in the orchards. Much progress is being made, however, in minimizing losses attributable to this latter cause.

The Department of Agriculture has been experimenting with the cooling of fruit in cold-storage warehouses before shipment, and therein lies a possible solution of this difficulty. Eastern-grown pears for export are refrigerated in cold-storage warehouses alongside the railroad before shipping. Peaches that ordinarily develop considerable decay in the top tiers of packages have been shipped by the Department of Agriculture after cooling to about 40° F., and have reached distant markets in prime condition. In one shipment of 8000 packages less than one per cent of soft and decayed fruit developed in the two upper tiers, while from five to thirty per cent developed in the two upper layers in cars cooled in the ordinary way.[1] In the semi-desert Imperial Valley of California, a cold-storage plant has been erected for the manufacture of ice and for the cooling of cantaloupes before shipment. The melons are often above 100° F., when picked, and they are placed in the warehouse where they are reduced to about 40° before loading. The great objection to this plan is the additional cost of the necessary plant, which may be used only a few months or even a few weeks during the year. The only possible way to meet this expense is to have the plants erected either by large associations of growers, or by the refrigerator-car lines or railroads, and handled as a part of the refrigeration service.

Another method that has been tried for cooling fruit before shipment is to cool it in the cars after it has been loaded, by forcing cold air through an insulated tube from a cold-storage warehouse into the car through the bunker. An exhaust fan draws the air out at the other end of the car.

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[1] Powell, *Yearbook of the Department of Agriculture*, 1905, p. 358.

This has been tried at Los Angeles, California, but has not proved very efficient, because it was found to take from thirty to forty hours to cool the fruit in the center of the packages to 40° F. A more successful application of this same principle is in use in a large cold-storage plant at Springfield, Mo., where bananas in cars are cooled in transit. The plant consists of a shed with four tracks, which will hold forty cars, and the cold air is carried by large air-ducts along the top of the shed, and forced into the cars through canvas tubes. The same plant may be used in winter to raise the temperature of the fruit when desired.[1]

The foregoing considerations tend to show that there is much room for improvement in the handling and transportation of our fruit crops, and as the output of the fruit districts is increasing, the problem of extending the market becomes more and more important. No country in the world has its facilities for handling perishable products so thoroughly developed as the United States. Very little has been done in this direction in European countries. In England, refrigerator cars are used only to a small extent, as the climate there is seldom so extreme as to make them necessary.[2] In France, the matter was looked into by Mr. Wm. A. Taylor of the United States Department of Agriculture in 1900 in connection with the forwarding of the American fruit exhibit to the Paris Exposition in that year. He could learn of but one refrigerator-car line in that country, and that was not much patronized by shippers of other articles than meats and fish. The rail hauls in European countries are so much shorter than in the United States, that refrigeration in transit is much less important than in this country.[3]

[1] Powell, *Yearbook of the Department of Agriculture*, 1905, p. 359.

[2] Letter from W. M. Acworth, London, Eng.

[3] Letter from W. A. Taylor, pomologist in charge of field investigations, Washington, D. C.

The value of having a car thoroughly insulated and carefully constructed so that none of the outside air can penetrate is well illustrated by the temperature of a refrigerator car in the winter time, when it is necessary to keep perishable freight from freezing. Except in extreme cold weather, the temperature in a well-built car may not fluctuate two degrees in ten days. Tests made by the Santa Fe show that while the outside temperature fluctuates 30° to 40°, the inside temperature fluctuates only 4° or 5°. Experiments made by the Burlington demonstrate that in zero weather a well-built refrigerator car will maintain a temperature about 20° higher than an ordinary box car for a number of days. Even the length of time that a car has been built makes a difference in the temperature, for in a new car it is apt to be from five to ten degrees higher in cold weather than in an old one. In extremely cold weather cars have to be placed in round-houses in order to keep the inside temperature from falling below the freezing point. The following table, taken from a copy of instructions issued by the Refrigerator Department of the Chicago, Burlington and Quincy Railroad, shows the temperatures at which it is necessary to place cars loaded with perishable freight in round-houses. Only a few items are selected.

	When loaded in	
	Box cars.	*Refrigerator cars.*
Apples	**20° above zero.**	**Zero.**
Cauliflower	**20° " "**	**"**
Eggs	**20° " "**	**"**
Lemons and oranges	**25° " "**	**"**
Peaches	**25° " "**	**"**
Potatoes	**30° " "**	**"**
Strawberries	**30° " "**	**"**
Tomatoes	**30° " "**	**"**

Shipments will stand about five degrees lower tempera-

ture when the cars are kept moving than when they are standing. Cars of dressed meat, fish, and dressed poultry are iced with cracked ice and salt the year round, the addition of salt maintaining an even temperature so that there is no danger from freezing.[1] Sometimes cars are artificially heated during cold weather and large oil stoves are generally used for this purpose. About 1903 the Burlington equipped a number of its cars with steam heaters at a cost of about $100 per car, with no extra charge to shippers, and it is the only road that has attempted this. During the winter of 1906-07 it experimented with heating solid trains of refrigerator cars by steam from the locomotive.

The operation of refrigerator cars, either by a private-car company or by a railroad, requires the maintenance of a system of icing stations, an efficient corps of inspectors, and also an adequate system of administrative and accounting machinery.

The placing of icing stations along the route is illustrated by the description of a shipment of oranges from Los Angeles to Boston, given by Mr. Armour in his book.[2] The car is iced before receiving its load, and the placing of the hot fruit in the car causes such a heavy shrinkage of ice that it has to be re-iced before starting on its journey eastward. If passing over the Southern route, the car is halted at Tucson, Arizona, where it is thoroughly re-iced again. The same process is repeated at El Paso and Fort Worth, Texas, at Kansas City, Mo., Galion, Ohio, Hornellsville, New York, and East Deerfield, Massachusetts, making nine or ten times that the operation is necessary. These icing points make necessary the maintenance of ice-houses, and the pro-

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[1] These two statements are taken from instructions issued by various railroads for the care of refrigerator cars.

[2] *Op. cit.*, p. 80.

curing of sufficient ice sometimes at great expense, especially in warm climates where natural ice is not available. In 1905, Armour claims to have bought more than 120,000 tons of ice in California alone. The refrigerator-car department of the Burlington publishes a list of sixty-five icing stations along the lines of its system; the Rock Island has about fifty.

Refrigerator cars require the most constant care and attention, and the railroads issue specific directions to their agents as to their proper handling. In the first place, they have to be kept sweet and clean, for if they become saturated by any offensive odor they are rendered unfit for the carriage of perishable products. Sometimes when a car is being returned for a cargo of perishables it is loaded with commodities which emit odors, and instructions generally include a list of articles which cannot be placed in the cars. For instance, the Burlington includes a rule in its special instructions to agents which forbids the loading of hides, tallow, or grease, Limburger cheese, oil or empty oil barrels, bones or fertilizers, tar or tar-paper, in its refrigerator cars. It also forbids the loading of musical instruments, plated stoves or castings, tin plate, or any freight subject to rust or other damage on account of dampness in the car.

General instructions from the head office also provide for the cleaning of bunkers when necessary, the testing of drain pipes, and the method of handling different kinds of shipments when under refrigeration, under ventilation, or during cold weather. The condition of the cars, the amount of ice placed in bunkers, the round-housing of cars, *etc.*,—all these things have to be carefully recorded by the agent and sent on prepared forms to the head office. Sometimes a messenger accompanies the cars to see that all these things are properly attended to. The car-line agents and inspec-

tors are stationed at all important points to look after the movement of cars and to make reports to the head office. In the case of railroads owning their own cars, many of these duties are attended to by regular freight agents, but it has been found necessary by those roads operating an extensive equipment, to maintain a separate corps of inspectors for this branch of the service on account of its specialized character. The Santa Fe, for instance, maintains such a corps of agents for the proper handling and care of its refrigerator equipment.

The transmission of the various reports to the head office requires a careful system of recording and accounting in this office, and consequently a large corps of clerks. For instance, let us glance at the organization of the Armour Car Lines, the largest and most important company in the country. Its main offices in Chicago are divided into two parts, which may be called the administrative and the car-accounting departments. The administrative department is situated in the same building with the general offices of Armour and Company. Here the general policy is laid down, icing charges are fixed, claims are adjusted and settlements made. In the car-accounting department, which is located in the Union Stock Yards in Chicago, the movement of cars throughout the country is recorded, and the system is so complete that the whereabouts of any particular car of the 14,000 operated can be ascertained at any time. For this purpose reports are made by agents stationed at the principal junction points, and sent by mail on postal cards which are printed according to a certain form and distributed by the head office. They show the number of the car, the time of passing a certain point, the road it is traveling over, the place of loading, destination, and routing. At the office in Chicago a separate record is kept for each trip that a car makes, and the forms used for this purpose

are filled out as returns from the agents are received. When a car has finished its trip there is thus a complete record of its journey from starting point to destination. Any question regarding claims, mileage, contents of car, or any other information may therefore be settled by reference to these records, which are filed away and kept for three or four years before they are destroyed. Some of the railroads operating refrigerator cars utilize the telegraph for reports from agents, and oftentimes these reports are most complete, including condition of car, quantity of ice in the bunkers, *etc.* Instructions issued by the general offices are often very specific and cover a great variety of details.

CHAPTER II

THE PART THAT SPECIAL-EQUIPMENT CARS HAVE PLAYED IN THE DEVELOPMENT OF THE COUNTRY

IN defense of private cars, general statements have often been made to show the wonderful things they have done in the development of certain industries, such as meat packing and fruit and vegetable growing; the opponents answer that it is not necessarily the *private* car that has done all this, but that it is the *refrigerator* car, whether owned by private individuals or by the railroads. Inasmuch as private concerns built the first refrigerators, and the railroads for years refused to furnish this equipment, the defenders of private cars have more or less reason for their claim. It is our purpose, however, to study the effect of the special-equipment car itself on the development of the country, and to disregard for the present the question of railroad or private ownership. Little has been written on this phase of the question, and it is not generally realized what a tremendous factor these cars have been in the economic and industrial history of the country.

Of the various kinds of special-equipment cars, by far the most important is the refrigerator car. It has revolutionized the livestock and dressed-beef industries; it has made it possible to transport fruit and vegetables across the continent and across the ocean, and has therefore resulted in the development of certain sections of the country which would have otherwise remained poor on account of their distance

from market. Some of the most important changes it has brought about we shall now consider.

EFFECT ON BEEF-PACKING INDUSTRY

As we have seen before, meat, in early times, was furnished by local slaughter-houses and the live animals were either shipped in the ordinary cattle cars of the railroads from the West to the Atlantic seaboard, or raised locally. There were extensive stockyards and slaughter-houses in all the principal cities of the East, and the carriage of live animals was an important item in the traffic of the trunk lines. During the seventies, as we have seen, dressed beef began to be shipped from Chicago to eastern markets in refrigerator cars.

It is easy to realize what great economies were made possible by this change. The weight of edible beef derived from a steer is only 50 to 57 per cent of the entire weight of the animal. In those early days, all the rest was absolute waste, and the slaughter-houses even paid sometimes to have it carted away. In other words, shipment of cattle meant the payment of freight on a steer weighing 1000 pounds in order to get about 550 pounds available for market. Furthermore, there was a deterioration in the value of cattle after a carriage of 1000 to 2000 miles in cattle cars; many became sick and died en route, there was always a considerable shrinkage in the weight of the animals, and the general quality of their meat was impaired. These economies were readily recognized and the shipment of dressed meats became general. As a result of this, the great packing centers of the Middle West began to spring up, and consequently the slaughtering of cattle in the East began to fall off. The following figures demonstrate this tendency:

TOTAL VALUE OF MEAT PRODUCTS FROM SLAUGHTERING AND PACKING.[1]

	1880.	*1890.*	*1900.*
Boston	$7,096,777	$2,782,823	$1,392,010
New York	29,297,527	50,251,504	38,752,586
Chicago	85,324,371	203,606,402	256,527,949
Kansas City	965,000	39,927,192	73,787,771

At one time, Chicago was near the borders of the cattle-growing districts, and the short haul to that point soon made it by far the greatest livestock and packing center in the country. The cattle-raising country gradually extended farther and farther westward and the Chicago packers followed this westward movement by erecting plants at Kansas City, Omaha, St. Louis, St. Paul, St. Joseph, and even followed the industry to Texas, and built great plants at Fort Worth. This shifting of the meat-packing centers was made possible by the use of the refrigerator car.

The westward movement of the cattle-raising industry itself has likewise been made possible by the refrigerator car. In the early days, when live cattle were shipped, the distance from west of the Missouri River to the Atlantic Coast was too great, and the expense of marketing the cattle too high, to make the raising of livestock profitable. With the introduction of refrigerator cars, the utilization of the vast grazing districts of the West was made possible. Thus, not only is the entire dressed-meat industry dependent on the refrigerator car for its existence, but also the raising of livestock has been extended, and many states have been developed and made wealthier through its use. As the Census of 1900 says:[2] "The importance of artificial refrigeration to the meat trade would be hard to overestimate. The most important step in the development of American beef

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[1] *Twelfth Census of the United States*, vol. ix, p. 391.

[2] Vol. ix, p. 416.

as an article of commerce, was the invention of the refrigerator car by William Davis of Detroit."

EFFECT ON AGRICULTURE

Fully as important as the part that the refrigerator car has played in the development of the meat-packing industry, is its effect on agricultural development, in connection with both fruit and vegetables. It was not very long ago that fruit was raised only on a small scale, as it had to be consumed locally, and could not be transported for any considerable distance. Fruit could be had at any given place only at the time it ripened locally, and any that was brought by express or other means a little before or after the short season of three or four weeks was very expensive and considered a great luxury. As a result of refrigeration in transit, these conditions have all been changed; fruit is carried from most remote sections of the country to the large cities throughout the year, and instead of being considered a luxury, it is looked on as a staple article of food. As Mr. Armour says in his book on private cars: "The operation of private fruit refrigerator cars has changed the growing of fruits and berries from a gamble to a business, from a local incident to a national industry." Few people realize what an enormous business fruit growing has become under the impetus given it by refrigerator cars, and not even the Department of Agriculture has adequate statistics on the fruit crop, which Mr. Armour estimates at about $400,000,000 a year.[1] In 1899 the principal fruit-growing districts of the country shipped under refrigeration only 9,164 cars; in 1905 the same districts shipped 42,982 cars. This

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[1] Armour, *op. cit.*, p. 93. (This estimate is undoubtedly too high. The *Census* of 1900 placed the figure at $130,000,000, but owing to the imperfect returns, and the increase since that time, this figure is much too low.)

gives some idea of the rapid growth during the past few years.

California offers perhaps the best illustration of the development of fruit growing through the use of the refrigerator car. It is the greatest fruit-producing state in the country, it is situated at the greatest distance from the important markets, and it therefore depends particularly on transportation facilities. The first carload of 300 boxes of oranges is said to have been shipped in 1876. This was not under refrigeration. Ventilator cars were used for a number of years, and fruit grown on the uplands, where it was dry, carried fairly well, even as far east as New York and Boston. Solid fruit trains of ventilator cars were run on express schedules from Sacramento to Chicago for a number of years, and by 1886 shipments had reached 1000 cars per annum. In his book *The Modern Farmer*, Mr. E. F. Adams tells of the first attack on eastern markets with deciduous fruits from California; fresh fruit was shipped in ordinary freight cars attached to passenger trains at a cost of $1400 for ten tons, or seven cents per pound. In contrast to this, he says that in 1894 this trade had increased to over 7000 cars, at a cost of one and one-fourth cents per pound.

It was not until 1887 that the refrigerator car made its appearance in California and Mr. F. A. Thomas as already stated was probably the pioneer in this direction. After he had demonstrated that fruit could be shipped successfully to Chicago, growers were induced to use the cars, and the experience of 1888 proved beyond all question the usefulness and practicability of the refrigerator car when properly handled. Deciduous fruit was first shipped this year under refrigeration from California, a carload of ripe apricots and cherries being successfully sent to New York without re-icing. The facilities for transportation under refrigera-

tion were very crude in those days, and there was not what could be called a re-icing station all the way from California to Chicago. These early shipments were generally made by filling a car with small allotments from different places, but with the development of larger plantings regular shipping points were established so that small growers received the same advantage as large shippers, except in the matter of carload rates. Later, associations of growers removed this disadvantage from the small farmer.

A review of the different refrigerator-car lines engaged in this early California business has been given in another place. Up to 1900 there were five competing car lines running to California, and scarcely a year passed without complaints on account of a shortage of cars[1] at some time during the season, with consequent loss to the growers. The competition between these lines led to the payment of excessive rebates on the refrigeration charges to the largest shippers in order to induce them to use certain cars. This was eminently unfair to the small producers, and had a demoralizing influence on the fruit-shipping business. In 1900, the Southern Pacific Railroad made an exclusive contract with the Armour Car Lines, whereby it promised to use nothing but Armour Cars, and in return for which the Car Lines promised to provide a sufficient number of refrigerator and ventilator cars to all shippers on equal terms.[2] Without discussing in this place the arguments for and against exclusive contracts, it may be said that the service since the making of this contract has been more efficient; there has been an adequate supply of cars, and rebates have

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[1] Geo. B. Robbins in testimony before House *Committee on Interstate Commerce*, Feb. 13, 1905.

[2] The terms of this agreement may be found in the testimony of Geo. B. Robbins before the Senate *Committee on Interstate Commerce*, May 16, 1905.

ceased. The season of 1906 perhaps offers an exception to this statement, in that there were complaints from shippers that they were not able to get enough cars. Railroad men in Chicago have expressed their opinion to the writer that this was probably due to the fact that the Harriman Lines had recently ordered equipment to supplant the Armour Lines, and that since 1906 was the last season the private company could operate, it was taking no pains to give adequate service.

There has been almost an equal division of this fruit traffic between the Southern Pacific and the Santa Fe Railroads during the last few years, the former operating in the northern part of California, and the latter in the southern, with but comparatively little chance for competition. The rivalry has been very friendly where there has been competition, and neither road has attempted to any extent to invade the territory of the other. The relations between the Harriman interests and the Santa Fe, recently made public, may possibly explain this friendliness to a certain extent. The movement of oranges and lemons from California for the last few years has been as follows:[1]

Date.	*Carloads.*
1894-95	5,575
1895-96	6,915
1896-97	7,350
1897-98	15,400
1898-99	10,875
1899-00	18,400
1900-01	24,900
1901-02	19,180
1902-03	23,871
1903-04	29,299
1904-05	31,422
1905-06	27,610

[1] *California Fruit Grower*, Dec. 22, 1906.

The thirty thousand carloads of fruit shipped during the season of 1904-05 amounted to over 10,000,000 boxes, valued in California at $27,000,000. Figures furnished by the Santa Fe Refrigerator Despatch Company show the increasing amount shipped each year in its cars under refrigeration, as compared with merely ventilation:

Year.	*Percentage under Refrigeration.*
1897-98	22%
1898-99	17%
1899-00	28%
1900-01	47%
1901-02	33%
1902-03	48%
1903-04	40%
1904-05	51%

The reason for there being so many shipped under ventilation alone is that the citrus-fruit shipments, which we are considering at present, are made almost entirely during the cold half of the year. The use of refrigeration is increasing, however, even in those months. The extent to which refrigeration is supplanting mere ventilation will be brought out more clearly in connection with the shipment of vegetables from California. Over 90 per cent of the deciduous fruit, which is shipped during the summer months, goes in refrigerator cars under ice.

Before leaving California, it will be well to glance at the deciduous-fruit industry. The development of this, although not so phenomenal as that of citrus fruit, has been remarkable. In 1895 it amounted to 4,568 carloads, in 1901 to 7,136 carloads and in 1905 to 8,224 carloads.[1] For 1905 the shipment of deciduous fruits by varieties was as follows:

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[1] *California Fruit Grower*, Dec. 22, 1906.

Fruit.	*Carloads.*
Apricots	279
Cherries	79
Grapes	1,602
Peaches	1,946
Pears	1,013
Plums	1,391
Various	1,914
Total	8,224

From the various figures given above, it will be seen that the fruit industry in California is still in its infancy; that it did not begin to assume any great importance until twenty or twenty-five years ago; and that in that time it has developed rapidly. Its fruit now reaches every town of importance in the United States and Canada, as well as many European and other foreign markets, and has been a factor in the decline of fruit raising in foreign countries, especially in the growing of oranges in Southern European countries. Furthermore, it is safe to say that no such expansion of the business could have taken place without the refrigerator car.

Georgia is one of the most important peach-growing sections of the country. In his annual report for 1875, Mr. Thos. P. James, Commissioner of Agriculture of Georgia, speaking of possibilities in fruit culture in that state, said:

> By the twentieth of June, Georgia might place on the markets of the large cities of the North a million bushels of the most delicious peaches, and have virtually a monopoly of those markets for one month. . . . With one-half the labor and expense now bestowed upon the culture of cotton, which sells at the cost of production, our farmers might secure millions of revenue from the sale of fruits.

Thus was it realized what was possible if there were efficient means of getting fruit to market.

Georgia[1] began raising peaches for local markets soon after the Civil War. In 1876 the present Georgia State Horticultural Society was organized, and it at once became active in encouraging fruit culture, and in studying means to get the product to distant markets. In 1877, a few peaches were sent to New York by express, and one shipper received $10 per bushel, which was about 16 cents for each peach. This fruit was picked ripe and packed in live moss. In 1879 refrigerator boxes, sent by express, brought fairly good returns. In 1880 peaches were shipped to northern markets by freight for the first time,—by rail to Savannah in stock cars, and thence in the refrigerator compartments of the steamers of the Ocean Steamship Company to New York. It was not until 1882 that the railroads began to furnish refrigeration in transit. The Central Railroad of Georgia converted a few box cars into so-called refrigerator cars to run from the fruit district to Savannah. The only change in the construction was the placing of a trough-shaped wooden ice chamber longitudinally through the car, which was filled with ice, and the fruit was loaded around it. The same year, the "Austell" refrigerator car made its appearance. This was similar to the modern refrigerator cars, except that it had over-head ice chambers. For the next two or three years, the fruit crop was a failure on account of late frosts, but with the transportation problem solved the fruit acreage increased rapidly, and by 1889 the refrigerator car was in general use.

The history of the fruit industry in Georgia reveals a number of disastrous years when sometimes there was not a carload of peaches shipped from the state on account of crop failures. In 1889 there had been over 150 cars shipped over the Central of Georgia Railroad, which

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[1] *A History of the Peach Industry in Georgia*, compiled by the Central of Georgia Railroad.

handles the bulk of the fruit crop. 1890 and 1891 were disastrous years; 1892 and 1893 good years with 250 cars the latter year; and by 1895 there were 743 cars handled. Some difficulty was experienced in procuring a sufficient number of refrigerator cars, and also in procuring ice for them. At this time there were five competing refrigerator-car companies in the field. In 1898 the Central of Georgia, apparently with the consent of the growers, made an exclusive contract with the Armour Car Lines, and since then the peaches of Georgia have been handled only in Armour cars. In that year there were 1733 cars shipped. Since 1898 the crop has increased to about 5,000 cars per annum.

The peach district of Georgia which was originally confined to one county, has spread practically over the entire state. New orchards are being planted every year, and indications are that the industry is still in its infancy. Fruit lands have increased in value in some cases from as low as one dollar an acre to about $300 an acre. It is easy to see from this review of the peach industry in Georgia, what a prominent part the refrigerator car has played.

The Michigan fruit belt, which extends north and south along the eastern coast of Lake Michigan, is an old district, and the fruit business there has not increased by leaps and bounds under the present influence of the refrigerator car, as it has in other sections, which are situated farther from important markets. For years the crop was dumped into Chicago and Milwaukee by steamer across the lake, with a resulting glut in these markets, and low prices. In fact, commission men in Chicago made handsome profits by reshipping the peaches to eastern markets, before the cars invaded the territory itself. The first attempts to handle Michigan peaches under refrigeration were made in 1889 by Mr. F. A. Thomas, the pioneer in the California business. As a large part of the producing territory was not easily

accessible to railroads, Mr. Thomas[1] leased for the season portions of the holds of two steamers plying between Saugatuck, Mich., and Chicago, a distance of about 90 miles. The compartments in these steamers were cooled, so that the fruit was in good condition when it reached the wharf in Chicago, where it was loaded into refrigerator cars, and then transported to distant markets. This rehandling was however, expensive, and injured the fruit, so that it has not since been attempted on a large scale.

As the Michigan district is so far north, and since the crop does not ripen until in September and October, there is not so much need of refrigeration as in the case of the districts lying farther south. Mr. Robbins, President of the Armour Car Lines, made an estimate in 1905, that about one-third of the shipments from the state were made under ice. Prior to 1900, however, refrigeration was hardly used at all, and the more extensive use of refrigerator cars, which have invaded the state in the last few years, has brought important benefits to the growers. With the refrigerator car came eastern buyers; the market was greatly extended, and prices rose; acreage increased; land values grew from less than $25 per acre before development for peach growing, to $250, $300, and even more, with bearing peach orchards. Great quantities of fruit are still shipped to Chicago by steamer from districts not accessible to the railroads, and prices in that city are consequently lower. Mr. Armour, in his book on private cars,[2] tells of the experience of representatives of eastern fruit houses who came to Michigan to buy. At the points served by private cars they found competing buyers, but discovered that great quantities were being sent to Chicago by steamer from

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[1] Taylor, *Yearbook of Department of Agriculture*, 1900, p. 576.

[2] Page 98.

places not served by the railroads. They forthwith went to Chicago, and bought Michigan peaches on the open market in South Water Street for shipment east, at lower prices than they would have had to pay over in Michigan at points served by refrigerator cars. This happened as late as 1904. Another instance is that of a grower of Shelby, Michigan, who shipped plums to two points, Chicago, Ill., and Dayton, Ohio. Those sent to Chicago brought 80 cents a bushel; those to Dayton, $1.45 a bushel.

The Armour people have handled the bulk of the Michigan fruit, and deserve credit for having stimulated the business, by acquainting eastern buyers with conditions, and bringing them to the state where they buy direct of the grower. In 1902 Armour made exclusive contracts with the Pere Marquette and the Michigan Central, and for two years handled all the traffic originating on those lines. The complaints that arose in connection with these exclusive contracts will be discussed in a later chapter. Besides peaches, Michigan also raises large quantities of plums, strawberries, apples, pears, melons, and grapes, and is shipping an increasingly large number of these fruits to points outside the state. In 1900, there were 4,360 cars of peaches shipped, and in 1904 the number had risen to about 8,000. This notable increase in the number of cars does not necessarily show a corresponding increase in the fruit industry of the state, but is rather an evidence of the more extensive use of refrigerator cars, as compared with shipments by steamer.

Thus we have traced the development of what may be called the three principal fruit-growing districts of the country, and have noticed the dependence of this development on the refrigerator car. Since the introduction of this means of transportation, however, and more especially within the last ten years, there have been other districts which had

never grown fruit to any extent, but which have now begun to come into prominence. The extent of this wholesale development of fruit lands may be shown by giving a few more examples.

The cultivation of strawberries offers a good illustration. But a few years ago, the length of time that strawberries were in the market at any one place was very short, as they are of an extremely perishable nature, and cannot safely be carried longer than twenty-four hours without being iced. The largest producing areas were those near the great markets, as in Maryland, Michigan, Ohio, and New York, and in 1899 those four states produced more than any others. With the perfection of the refrigerator car, however, strawberries began to move from the Southern States at the time of ripening there, and are now commonly seen on the fruit-stands of the northern cities in mid-winter. This has led to the rapid development of strawberry plantings in certain sections of the South, the most important ones being in the Carolinas, Florida, Arkansas, Tennessee, and Missouri.

Strawberries were first shipped from Florida to New York under refrigeration in 1888, but this traffic did not assume much importance until within the last five or ten years. North Carolina is now the most important of these southern districts, while fifteen years ago the crop there was almost nothing. A few berries were shipped at first by express in refrigerator chests, and many continued to be shipped in this way even after the advent of refrigerator cars. Shipments by express and by ventilated cars have been superseded by the use of this more modern device, as illustrated by the following figures: traffic carried[1] from North Carolina in refrigerator cars increased from 1897

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[1] *Twelfth Census of U. S.*, vol. vi. p. 305.

to 1900, 152 per cent, while that carried by express companies increased only 31 per cent and that forwarded by ventilator cars decreased 82 per cent. As a net result of these changes the proportion of the whole traffic carried in refrigerator cars in 1900 was 80.7 per cent while in 1897 it was only 67 per cent. Since then the proportion carried in refrigerator cars has increased still further, until now it is over 90 per cent.

Fifteen years ago the shipments from North Carolina were unimportant, in 1897 they amounted to about 500 carloads and in 1904 to over 3000 carloads. Since the season lasts only a month, this meant 100 carloads a day. Chadbourn, N. C., did not ship a carload ten years ago, but is today the largest berry-shipping point in the United States. The Atlantic Coast Line carries the bulk of this Carolina business, and since 1898 Armour cars have been operating over this road under an exclusive contract. During the early nineties, three or four other companies had been competing for the business, the service was not reliable, and it was on the recommendation of the growers themselves that an exclusive contract was given to Armour. In 1905, shipments increased at one time to 200 cars a day, and there was a shortage of cars owing to poor handling of empties and freight blockades, with a consequent loss to the shippers of thousands of dollars. As a result of this, Armour settled claims for $75,000.[1]

Florida has, of course, derived great benefits from the development of modern transportation facilities, but this state has never fully recovered from the freeze of the late nineties, and has been overshadowed by California in the production of subtropical fruits. Florida has the ad-

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[1] G. B. Robbins in testimony before Senate *Committee on Interstate Commerce*, May 15, 1905.

vantage of being the farthest south, and consequently is able to take advantage of the high prices paid for the earliest shipments. This fact, together with the destruction of so many of the orange trees, has led to a diversification of crops, the principal of which are strawberries, grapefruit, peaches, and pineapples.

The railroads, through their industrial commissioners and their refrigerator-car departments, have aided in developing certain sections along their lines and have advertised them by means of descriptive pamphlets which have been distributed broadcast. Texas, especially, is at present being advertised by the roads entering that state. Many out-of-the-way places in the Western States, where a few years ago it was never thought that it would pay to raise fruit on a large scale, are now sending carloads of perishable orchard produce to the eastern markets, with resulting prosperity among the farmers, and increasing land values. States that have been benefited in this way are Utah, Arizona, Idaho, and Arkansas (where the Ozark region deserves special mention for its apples and peaches). The far Northwest now sends to market from 2000 to 3000 cars of fruit a year, and the northern routes across the continent have efficient refrigerator equipments of their own. The State of Washington, especially, is coming to the front in the raising of apples.

EFFECT ON VEGETABLE GROWING

The transformation of industries brought about by modern methods of transportation, is nowhere more clearly evidenced than in vegetable gardening. Until the latter half of the last century, vegetables were grown within a short distance of the market for which they were intended, and could be supplied only during the brief period when the several products were locally in season, except that small

quantities were produced under glass. The location of the first truck farms was determined by proximity to water-transportation facilities; thus one of the earliest centers for this business was along the shores of Chesapeake Bay, where fast-sailing oyster boats were employed for sending the produce to the neighboring markets of Baltimore and Philadelphia. Likewise the gardeners around New York began pushing out along Long Island, using the waters of the Sound for transporting their produce. The trucking region on the eastern shore of Lake Michigan is another example of the effect of convenient water transportation in causing the early development of farming on a large scale.

From these centers, the industry gradually began to spread southward, *pari passu* with the development of transportation facilities. In the early fifties, the raising of vegetables for northern markets began around Norfolk, Virginia, and in 1854 the first cargo of 200 barrels of garden truck was carried from this port by steamer to New York. To secure proper ventilation it was necessary that these should be carried on deck so that only a small load was possible until efficient means of ventilation were devised. The first all-rail shipment from Norfolk to New York was made in 1885, and with the use of the ventilator car, and later of the refrigerator car, the area of production began to extend rapidly southward and westward. Charleston and Savannah soon became centers of important trucking regions, and then came the whole state of Florida. The development in this state has been very recent; from one section which raises lettuce, celery, pease, beans, and cucumbers, the shipments increased from about 100 cars in 1898 to over 800 cars in 1904.[1] Extending northward and westward from Florida are the watermelon region of

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[1] Testimony of T. B. Felder before House *Committee on Interstate Commerce*, Feb. 16, 1905.

Georgia and the trucking districts around Mobile and New Orleans. Texas is now being developed and this state, on account of its remarkable soil and climate, gives promise of becoming one of the greatest, if not the greatest, vegetable-growing states in the country.

A development analogous to this has also taken place in the districts around Chicago. With the building of the Illinois Central, the region in Southern Illinois was first opened up. From this point the business has gradually extended to Tennessee, Missouri, Mississippi, and Arkansas. About seven or eight years ago fifty cars of tomatoes were shipped from Humboldt, Tennessee, during a season. These had to be shipped green, and ripened in the commission man's store room, thereby impairing the quality. This point now ships over 500 cars a season, the tomatoes are allowed to ripen on the vines, and therefore bring much better prices.[1] Crystal Springs, Mississippi, has long been the greatest tomato-shipping point in the world. The industry began there about 1875, and in 1885 it was shipping from five to eight cars a day. In 1895 the number had increased to between forty and fifty cars a day.

The extension of truck-growing districts has also spread to the West and even as far as California. Shipments of vegetables from this state to eastern markets for the past few years have been as follows:

Year.	*Cars.*	*Percentage of total carried by Santa Fe under refrigeration.*
1897-98	738	18%
1898-99	870	25%
1899-00	1,530	50%
1900-01	1,918	69%
1901-02	2,181	67%
1902-03	2,076	72%
1903-04	2,230	84%
1904-05	2,263	90%

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[1] Armour, *op. cit.*, p. 93.

The last column of figures shows to what an extent shipment under refrigeration has supplanted that under ventilation, and shows furthermore that practically the entire crop is now carried under ice. Other sections west of the Mississippi have also sprung up, such as the Ozark Mountain region in Arkansas, certain districts in Iowa, and Kansas, and the irrigated territory of the Arkansas Valley in the eastern part of Colorado, where the famous Rockyford cantaloupe region is located. The development of this region illustrates so well the influence of refrigerator cars, that a short review of its history is instructive.

The Rockyford cantaloupe was first grown for markets at Rockyford, in the southeastern part of Colorado, in 1885, and for years it was raised on a small scale and sent only as far as Denver, Pueblo, and other cities within easy reach. In 1894 the growers coöperated and shipped for the first time in carload lots. Transportation facilities were not adequate for the handling of the crop, and the adjacent markets were flooded with melons, with consequent loss to the farmers. It was not until 1897 that shipments were made as far east as New York, by means of the refrigerator car. This expansion of the market was immediately attended by an increase of the business, and the Rockyford soon became famous in the eastern markets for its thick flesh and delicious flavor. In 1897 there were 121 cars shipped from the Rockyford district; in 1904 the number had increased to 1,182. In the same time land values had increased from five dollars to $100 and $150 per acre. It is not to be inferred that the prosperity of this section is due entirely to the use of the refrigerator car, because the raising of melons would have been impossible without irrigation. When the lands of the Arkansas Valley were first irrigated, alfalfa became the principal crop, and naturally contributed to the advance in land values. The enormous

increases in values, as cited above, were, however, due to the growth of the melon industry, which, in turn is dependent on the facilities for transportation to distant markets.

Prior to 1897, the high prices and limited supply made the cantaloupe a great luxury, and it was too expensive for the ordinary grocer to handle. New York had been supplied for years with an inferior melon, mainly from Maryland, Delaware and New Jersey, and the season lasted but a few weeks. When the superior qualities of the Rockyford became known, other districts all over the country began to raise it—principally Florida, Georgia, the Carolinas, Texas, and California. The result of this expansion of the growing area is that New York is now supplied with melons from early in May until late in October. The earliest shipments come from Florida, and then from districts farther and farther north as the season advances. The cantaloupe is a highly perishable commodity and requires careful handling and supervision in transportation. It thus furnishes, perhaps, one of the most striking examples of the change that has been wrought by the refrigerator car on our agricultural development. In 1897 the amount consumed in the United States was not over 400 carloads. This amount gradually increased until during the year 1905, 6,920 carloads were used throughout the country, and the season for cantaloupes has changed from a period of less than two months to six months of carload business.[1]

The consumption of those vegetables which are the most perishable has shown the greatest increase under the influence of refrigeration in transit. For instance, not more than seven or eight years ago, one car a day of head-lettuce was sufficient to supply the New York market. Now, New

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[1] *Development of the Rockyford Cantaloupe Industry*, by P. K. Blinn. Bulletin 108, Colorado Agr. Experiment Station.

York alone uses forty to fifty cars a day during the winter months. Many vegetables of this nature were formerly raised at great expense under glass near the large cities, so as to take advantage of the fancy prices that could be obtained early in the season. The competition of southern districts, however, has forced many of these hot-house cultivators out of business. Celery, cauliflower, asparagus, and cabbages, are shipped to a great extent in refrigerator cars. The Illinois Central long ago earned the sobriquet of "the cabbage route" from the fact that it was moving trainloads of cabbages north daily during spring and early summer, and equally large quantities south during fall and winter. The need of refrigeration for asparagus is illustrated by a recent occurrence in Chicago. A car came to that city loaded with asparagus, and through some mistake no ice had been placed in the bunkers. As asparagus is packed in damp moss, it was found on opening the car that the asparagus stalks had grown a foot, and were unfit for market. The principal celery-growing district of the country has always been around Kalamazoo, Michigan. Now celery is grown in California and in some of the Southern States. In 1904 an island in the San Joaquin River in California began to raise celery for eastern markets. In that year it shipped eight carloads, in 1905, forty carloads, and in 1906, 400 carloads, at a profit of seventy-five dollars an acre. Not one pound of this could be shipped if it were not for refrigerator cars.

In the shipment of the more hardy vegetables, refrigerator cars are used perhaps even more in winter than in summer, in order to keep them from freezing. Potatoes, for instance, are being shipped in this way more and more every year. Vegetables grown for export are more apt to be sent under refrigeration than those destined for domestic markets. In fact, the demand for refrigerator cars for the

shipment of vegetables of all kinds is increasing rapidly, and judging from the comparatively recent origin of this business, and its growth during the last few years, it may be considered as still in the early stages of its development.

Another important class of commodities, the transportation of which over great distances is largely dependent on refrigerating facilities, is dairy products, which include principally butter, cheese, eggs, milk, and dressed poultry. In fact, the refrigerator cars operated by the Pennsylvania Railroad, numbering about 3500, are used almost entirely for this business. Their ice capacity is not so great as that of the ordinary fruit car, and at certain times of the year, when fruit shipments originate along the Pennsylvania Lines, especially in Delaware, the traffic has been handled in Armour cars, although not under an exclusive contract.[1] The cars of the Merchants' Despatch Transportation Company, the line operating over the New York Central Lines, are also intended primarily for this kind of traffic. The growth of dairy farming in Wisconsin, Iowa and Nebraska, as well as in other western states, has been due in a great measure to these superior facilities for getting goods to eastern markets.

A single illustration of this development will suffice. Ex-Governor W. D. Hoard of Wisconsin, speaking before the Wisconsin Dairymen's Association[2] in 1900, told of the early history of the industry in that state. In 1873 there were about a million dollars' worth of dairy products in the state; somewhere in the neighborhood of forty cheese factories struggling in a feeble way; no creameries, and few private dairies. It was costing two cents and a

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[1] Armour, *op. cit.*, p. 269.

[2] *Twenty-eighth Annual Report of the Wisconsin Dairymen's Association*, 1900.

half a pound to ship cheese to New York City in ordinary box cars, and the channels of commerce were blocked to Wisconsin dairymen, as they had to send their products to Chicago, and then have them reshipped to eastern markets. About that time Mr. Hoard interviewed Mr. W. W. Chandler, the originator of refrigerator cars on the Pennsylvania Railroad, and induced him to send some of his cars to Wisconsin. Mr. Chandler himself went to the principal shipping points, and explained to the dairymen the whole system of refrigeration as it was understood in those early days, and offered a rate of one cent a pound in iced cars to New York City. The business immediately began to grow. In 1876, at the Centennial, Wisconsin men took the first premium on their cheese. By 1890, many farmers had turned their attention from wheat farming to dairy farming, and the state was sending large quantities of butter and cheese to the Atlantic seaboard, some to be used there, and some to be sent to England. In 1900, it was estimated that the dairy products of the state had an annual value of $35,000,000, and land values had increased from eighteen dollars to between sixty and eighty dollars an acre.

EFFECT ON PRICES

We have now reviewed some of the more important phases of our agricultural development, which have been dependent on the refrigerator car. It is also interesting to notice the effect of this development on prices of agricultural produce. Statistics of the prices of fruits and vegetables are meager for two reasons: first, because a national market has but recently supplanted local markets for these goods, and second, because there has been so much irregularity in the size of packages that uniform price quotations in the majority of cases have been next to impossible. Although the size of packages still varies to some extent in different

parts of the country, yet there has been much progress in attaining uniformity for the most important products. Furthermore, price statistics over a series of years would tell but little in the case of fruit, especially, because the crop varies to such an extent with climatic conditions that the fluctuations in prices from year to year are enormous.

Some general tendencies in the prices of fruits and vegetables may, however, be noticed as a result of improved transportation facilities. These are: first, a greater stability of price in any particular market; second, a general leveling of prices throughout the whole country; and third, a general raising of prices for the growers situated at a distance from the large markets.

As to the greater stability of prices over a more extended time, it is well known that the price of a perishable commodity is high when it first makes its appearance in the market and that it gradualy falls, sometimes to a very low level at the height of the season, and then rises again as the season wanes. Before the advent of refrigerator cars, these fluctuations in prices were much more extreme than they are now, and covered a shorter period. Any particular market could be supplied with such an article only at the time of year that it ripened in the vicinity of that market. For instance, take strawberries in the City of New York. The first berries that reached the city were either those raised under glass, or sent from Delaware or New Jersey by express at great cost, and these naturally obtained fancy prices paid by the wealthier classes. When the berries began to ripen locally and on Long Island, the price fell rapidly, and often reached a point so low as to be unremunerative to the growers and the season came to an end abruptly with the last of the locally-grown berries, having lasted approximately six weeks. With the use of the ventilator car, the area of production was extended slightly and

berries began to arrive a little earlier. Then came the refrigerator car, and the consequent development of the vast strawberry fields of the Carolinas, Georgia, and Florida. Berries now begin to arrive in mid-winter from Florida. The first ones command a high price, to be sure, but by the end of the winter months the price falls to a point within reach of large classes of people, and remains comparatively stable until the berries ripen locally. After these have passed, small quantities of berries continue to find their way to market from more northern sections, and the price gradually rises again. Thus the season for strawberries has been increased from about six weeks to over six months, with the prices fairly uniform a large part of the time, and within reach of all but the poorest classes. It is evident that this result has been brought about through the extension of the producing area, which in turn, has been made possible by the refrigerator car.

The second tendency, the leveling of the prices of perishable commodities throughout the whole country, is due to the extension of the market area. When each fruit-growing district, for example, was dependent on the nearest city for the sale of its products, the market was very limited, and there was no relation between the different markets of the country. For instance, Chicago might be flooded with peaches at very low prices, while, at the same time Boston might have but few peaches at high prices.

Prof. Marshall,[1] in discussing markets and their effect on the equilibrium of demand and supply, divides commodities into two classes,—those having a national and even international market, such as the securities of corporations and the precious metals, and those having but a limited market, such as perishable and bulky goods. He says,

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[1] *Principles of Economics*, 3d ed., p. 406.

"There are indeed wholesale markets for the second class, but they are confined within narrow boundaries; we may find our typical instance in the sale of the commoner kinds of vegetables in a country town." When Marshall wrote this, vegetables undoubtedly were a good example for his purpose, but within the last few years the vegetable market has been so widely extended, especially in the United States, that the illustration is no longer applicable. Today the market in this country for vegetables and fruits is almost a national one, and may even be called an international one, and the different sections of the country are in such close contact, that there is a general equalization of the supply according to the demand, and consequently a fairly uniform price level throughout the country. Of course the adjustment is not by any means perfect, but by constantly studying the markets, growers ship their products to that point offering the largest return. Oftentimes prices fluctuate, and a market becomes glutted while a shipment is in transit. The shipper can then telegraph ahead to some junction point, and have his car diverted to some other point. Armour says that in 1904, during the month of July, more than 500 cars of Georgia peaches were caught at Cincinnati alone,[1] diverted from their original destination, and sent to other places where the prices were higher. In this way, markets react on one another, and by the control that the grower has over the destination of his products, there is a general leveling of prices throughout the whole country.

The third effect on prices, the raising of prices for the growers, is evident in many instances. There are some minor exceptions to this tendency, such as the case of growing under glass in northern climes for the sake of taking advantage of the high prices at the beginning of the

[1] Page 85.

local season, and in some instances, as we have seen before, such producers have been forced out of business by the competition of products brought in refrigerator cars from warmer sections, where they have been allowed to ripen naturally. The raising of prices for Michigan peach growers has already been alluded to. When the crop used to be dumped in Chicago and Milwaukee by means of steamers across Lake Michigan, those markets invariably became glutted, and prices were exceedingly low, often with resulting loss to the shippers. The same principle is illustrated in the history of the cantaloupe industry in eastern Colorado. When only the local markets of Denver, Pueblo, *etc.*, were open to producers, the prices were often so low that the season's crop resulted in a loss, and it was not until 1897, when the market was extended to the east of St. Louis, that the cultivation of melons was rewarded by adequate returns. Likewise, in California, the carriage of fruit to eastern markets was obstructed at one time during the season of 1894, the San Francisco market became flooded, and prices were slaughtered, but with the resumption of eastern business, they recovered again. Examples of this sort might be multiplied indefinitely, especially in the case of sections far removed from markets, where a few years ago it did not pay to produce on a large scale, and where the increases in land values now bear eloquent testimony to the improved condition of the farmers.

We have now completed our survey of the history of special-equipment cars, and the part that they have played in the development of the country. As intimated in our introduction, the second part has been studied almost exclusively in connection with the refrigerator car. Although there are other phases of the development which might have been discussed, enough has been said to show the important rôle that this modern device of transportation has

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played in building up certain agricultural sections of the country. It has been the purpose of this sketch to impress the reader with the importance of this factor at a time when private cars in general are being discredited by a large majority of the public, who realize but little the great benefit that they, together with the cars owned by the railroads, have conferred on the country at large.

The foregoing discussion has been in the nature of a preparation for a study of the relations which the privately owned special-equipment cars bear to the railroads. We shall now proceed to trace the history of this relation, to study the practices of the private-car lines, to reveal the evils in connection with their use, and to endeavor to suggest remedies for the abuses which actually exist.

CHAPTER III

FINANCIAL RELATIONS BETWEEN PRIVATE-CAR LINES AND THE RAILROADS

IT is commonly supposed that the private car is of comparatively recent origin. The systems of such cars operating at present over the railroads of the country have, indeed, developed during the last three decades, but these were not by any means the first to be used in the United States. Private cars date back to the very inception of the railroad business, for in the early days it was a common theory that the roadbed and motive power should be furnished by the railroad, and the cars owned by the shippers. In general, it is possible to outline three distinct epochs in the railroad history of the United States during which privately owned cars have been in general use. These are: first, the few years immediately following the building of the first railroads, from about 1830 on, when cars were owned by private individuals and companies in accordance with what may be called the public-highway theory; second, the period from about 1860 to about 1875, during which years many of the fast-freight lines, which were then coming into existence, were not owned by the railroad companies; and third, the period beginning about 1880 and continuing today, which is marked by the development of the ownership by private companies of cars of special design, such as stock, tank, and refrigerator cars. Before discussing the relations of these private companies to the rail-

roads today, we shall give a short sketch of these relations during the two earlier periods.

The theories of transportation in vogue at the time the first railroads were built were an outgrowth of the system of turnpikes then in general use. Turnpikes were public highways over which anyone could drive his vehicle, and the company which built and maintained the road exacted tolls for its use. On the very earliest railroads that were built, horses were used for the motive power, and generally in these cases, the public-highway theory was continued. The introduction of the locomotive gave rise to a new problem, because there were no precedents for a transportation system in which the ownership of the road itself was combined with the ownership of the vehicles and motive power. Of course the locomotive, from the first, was owned by the railroad for obvious reasons, although, strange as it may seem, the introduction of this new form of motive power on the old horse-railroads was objected to by some on the ground that it would revolutionize the transportation system, and deprive many people of their free use of the public highway. Although many of the roads began building their own freight cars, yet in a great many instances, these cars were owned and furnished by shippers and individuals.

There was an interesting instance of this early private ownership of freight cars on the so-called *Composite System* of state-owned railroads and canals in Pennsylvania where the vehicles continued to be owned by individuals, firms, or private corporations until the commonwealth disposed of its public works after nearly twenty-five years of state management.[1] An article on the Philadelphia and

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[1] J. L. Ringwalt, *Development of Transportation Systems in the United States*, p. 91.

Columbia Railroad in Pennsylvania, published in 1840,[1] gives the salient facts concerning the relations of these privately owned cars to the railroad. "All the cars used on this road belong to individuals or companies, but the motive power is furnished by the state, except in the case of the West Chester cars and some few others, which are drawn by horses." The writer goes on to explain that the collectors kept separate accounts of tolls for the use of the roadbed, and for the motive power. As will be seen from the following, the total charge exacted by the railroad was composed of four separate parts: first, a toll for the use of the road levied on goods carried, varying from six mills to four cents per ton per mile (all freight being classified under twelve different rates, the average of which was about two cents per ton-mile); second, a toll for the use of the road levied on the cars,— "one cent per mile on each burthen car, two cents per mile on each baggage car, and on every passenger car, one cent per mile for each pair of wheels;" third, a toll for motive power levied on goods carried at the rate of twelve mills per ton; and fourth, a toll for motive power levied on the cars,—"for each car having four wheels, one cent per mile, for each additional pair of wheels, five mills." An estimate of the railroad charges on a four-wheel burden car loaded with three tons of dry goods was computed as follows:

Road toll on car	1 cent per mile.
Road toll on 3 tons dry-goods	12 cents per mile.
Motive-power toll on car	1 cent per mile.
Motive-power toll on 3 tons dry-goods	3.6 cents per mile.
Total toll	17.6 cents per mile.
Toll per ton per mile	5.86 cents.

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[1] C. H. Wilson, "Notes on the Philadelphia and Columbia Railroad," *Journal of the Franklin Institute*, May, 1840.

Since the owners of the cars charged $7.50 for every ton of dry goods carried the length of the road (82 miles), or 9.14 cents per ton per mile, there remained to them, after paying 5.86 cents, a profit of 3.28 cents per ton-mile.

In another instance the charges were not so complicated, and the relations between the actual shipper and the railroad company would seem to have been more direct. An old time-table of the Ithaca and Owego Railroad in New York State, printed in 1838, says that the "train of transportation cars" stops at certain enumerated stations "to take in and discharge loading, and to receive such cars as may be in readiness to join the train." It also states that "no burden cars are permitted to run upon the road except such as are registered in the secretary's office in Ithaca and have a certificate of fitness from the engineer, and a way-bill of loading must accompany each car not belonging to the company's train, and toll paid at the gates at the rate of three cents per tun per mile." "The burden cars" referred to above were owned by individuals who, under the provisions of the charter of the road, could have them added to the company's trains at certain points along the route.[1]

The private ownership of railroad vehicles, however, was soon supplanted almost entirely by the system of railroad ownership, and by 1840 or 1845 the change was nearly complete. This transition from the old public-highway theory was well summed up by George Ticknor Curtis, referring to this subject in 1880:[2]

> The ideas of the first projectors of the railroads in New England, and of the public, as to the use that would be made of them, were exceedingly crude. The earliest charters granted in Massachusetts contain traces of an expectation that the com-

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[1] *Express Gazette*, Nov. 15, 1902.

[2] Ringwalt, *op. cit.*, p. 92.

pany would lay down the rails, and that the public would somehow drive their own carriages over them. In this imperfect conception of what was to be done, the railroad, it was supposed, would be operated like a chartered turnpike, the proprietors having the right to take tolls of those who should drive their own carriages over the road. It was not until a later period, after the English example was better known, that it was seen here, that a railroad could not be worked like a chartered turnpike, or like a public highway; that it would be impracticable to admit the carriages of individuals to pass over the rails. . . . The supposed analogy, therefore, between the railroad and the chartered turnpike . . . . entirely disappeared.

The second period of private ownership of freight cars began with the establishment of the fast-freight lines, some of them making their appearance in the late fifties, but most of them during the sixties. The reasons for their coming into existence lay in the fact that the railroads west of the trunk-line termini were short and independent lines. Each company carried freight only to the end of its line where it was unloaded, turned over to the connecting road, and loaded again. The roads took receipts from one another, and bills of lading were made out only to the end of the road receiving the freight,—except that in some cases through bills of lading were used. These, however, were so hedged in by limitations as to the liability of the particular railroads that the consignee in case of loss or damage or overcharge was compelled to go to the offending railroad, irrespective of how near or remote that company might be.[1] This transshipment of freight necessarily resulted in delays and damage to the much-handled property, and the demand for some system of through-routing

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[1] Hepburn Committee, *Investigation of Railroads* (New York State), 1879, vol. iii, p. 2959.

finally brought about the fast-freight lines. Instead of coöperating, the railroads left the establishment of these lines to private companies. Kasson's Despatch, a line operating over the New York Central, and later merged into the Merchants' Despatch, was the first line formed, in 1855 or 1856. The next was the Great Western Despatch, which confined its operations to the Erie and its western connections, and which began business in 1857. During the sixties a number of other lines sprang up, such as the Merchants' Despatch, Union, National, Star, Diamond, Globe, Empire, *etc.* In some cases, these early lines were owned jointly by railroads and outside companies, but more generally by the private companies alone, although it was alleged that railroad officers were often financially interested in them.

The contracts that these various companies held with the railroads were varied, and it is difficult to say just what the relations were. One writer says that the company furnished its own cars, made contracts with connecting railroads, paying them specific sums for the privileges granted, and established its own freight agencies in the various cities.[1] A common arrangement was that the fast-freight line should pay the railroad so much per car, irrespective of the freight carried, and whatever the car line could get for freight, over and above the payment to the railroad, constituted its profit. In some cases this arrangement was very remunerative to the freight line. Another form of agreement provided that the railroad should pay the freight line a certain percentage of the freight rate, and in one case of a contract between the Erie and a certain line, these percentages ranged from fifteen on the first and second classes of freight down to five on the fourth class.[2]

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[1] Bolles, *Industrial History of the United States*, p. 660.

[2] *Hepburn Committee Investigation*, vol. iii, p. 2963.

These early fast-freight lines, which have been called non-coöperative lines, were a great boon to shippers, and did much to stimulate through traffic; but there was a growing opposition to them owing to the fact that they were earning large profits which the railroads themselves might have had, and because it was alleged that they enabled officers of the railroads who were interested in them to make profits which belonged to the stockholders. The result was a new form of fast-freight line,—the coöperative line, as it has been called,—which was owned by the railroads. Many of the freight lines already in existence were acquired by railroad companies, and new ones were formed,—connecting roads between principal points supplying quotas of cars towards the common equipment of a coöperative line. This new class of lines took their names from particular colors, as the Orange, Blue, Red, and White Lines. By 1875 the private lines had passed almost entirely out of existence.[1]

The third era of private cars began soon after the non-coöperative fast-freight lines disappeared, but it was not until during the eighties that they became numerous enough to attract much attention. It has been shown above that the reason for the formation of the fast-freight lines was the necessity for some efficient method of handling through freight. The fundamental reason for the growth of the private-car system which we have today, was this: prior to their establishment all commodities were carried in the regular railroad cars, but it was discovered that certain kinds of goods, such as fresh meats, fruits, and vegetables, which were just beginning to be shipped by rail, could be transported to much better advantage in cars of special design, rather than in the ordinary freight cars then in use. The railroads, as we have seen, were slow in meeting the

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[1] Ringwalt, *op. cit.*, p. 192.

demands for improved vehicles, and therefore it was left to the shippers to take the initiative in that respect. This movement was a partial revival of the primitive theory, according to which the railroads were expected to furnish only the roadway and the motive power,—but here the analogy ceases, because instead of the railroads' exacting toll for the running of cars over their lines, they now had to compensate the owners of these special-equipment cars for the privilege of hauling them. In other words, railway companies rented the cars of individuals, instead of permitting individuals to hire the right to run their vehicles over the railroads.

The early history of these private lines has been discussed in a previous chapter. It will be remembered that the railroads failed to provide this special equipment for two main reasons: first, that they did not wish to go to the expense of building equipment which was in the nature of an experiment, and which could be used only at certain times during the year; and second, that the railroads were engaged in a heavy traffic in livestock to the Atlantic seaboard, for which they owned a sufficient number of cars, and neither they nor the livestock interests wished to see this lucrative business curtailed by the substitution of dressed-beef traffic. Although material on the subject is rather meager, there is enough to give a fairly good idea as to the relations of these private cars to the railroads, and to enable one to understand how the present arrangements as to payment of car-mileage by the railroads have come about.

At first, it would appear that there was no mileage allowed on the use of these private cars, whether loaded or empty.[1] This condition, however, lasted only a short time, and we

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[1] Testimony of J. W. Midgley, I. C. C., Oct., 1904. *Hearings.*

soon find the railroads paying a mileage rental. This payment of mileage, however, was on loaded cars only, and in the case of tank cars the railroads charged the companies for hauling "empties." For example, the charge levied by the roads in transcontinental territory for this service was about $80, while from the Missouri to the Mississippi it was $25 per tank.[1] This return charge was abandoned at an early date east of the Mississippi, and soon afterward it was done away with in the West. The change was due to competition; a comparatively new road running west from Chicago, in order to secure some of the oil traffic between that point and the Missouri River made a contract with the Union Tank Line to pay three-quarters of a cent a mile on all tanks carried over its line, whether the cars were loaded or empty. As the Union Tank Line, which was and is a subsidiary concern of the Standard Oil Company, carried practically all the oil offered for transportation, the other roads were obliged to make similar arrangements with this company in order to hold their traffic. This rate of mileage, three-fourths of a cent, loaded or empty, which was at that time the universal rate of payment by one railroad for the cars of other roads running over its lines, has since continued to be the rate on tank cars in almost every part of the country, although there have been attempts on the part of the railroads, of which we shall speak later, to reduce it.

The owners of the palace stock cars did not find it so easy a matter to induce the railroads to pay them a mileage rental. The railroads, which owned ordinary stock cars, thought that their equipment was sufficient and did their utmost to discourage the use of the improved cars that private companies were building. Furthermore, — and this

[1] Midgley, *Railway Age*, vol. 34, p. 369.

was the important factor,—the owners of palace livestock cars were not originators of traffic, as the tank-car owners were, and the stock-car companies were exacting at the same time two and one-half cents per mile from shippers for the use of their cars. The railroads were not handicapped, therefore, by having to deal with owners of cars who were also shippers, and were able to act more independently and without the danger of incurring the disfavor of shippers. Accordingly, they declined at first to pay mileage on such cars.

Soon after the Interstate Commerce Commission was appointed, in 1887, the Burton Stock Car Company, one of these private lines, complained to the Commission that the Chicago, Burlington and Quincy, and other railroads, were discriminating against them by refusing to allow the regular mileage of three-quarters of a cent for the use of their cars. It seems that this company had been building cars ten, fifteen, and even twenty feet longer than the railroad stock cars, but on account of the space occupied by contrivances for the safety and comfort of the animals, they carried fewer head of cattle than the railroad cars. In order to discourage their use, the railroads had inserted a provision in the western classification in 1887, that livestock carried in special or palace livestock cars, not the property of railroad companies should be charged from 120 to 150 per cent of the published rate, varying and increasing with the length of the car. The Chicago and Alton did not accept the foregoing rule of the western classification, but in the same year provided for a charge of five cents per mile for empty cars, as well as for higher freight rates on livestock in cars over thirty feet long.[1] The Interstate Commerce Commission, after a study

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[1] Midgley, *Railway Age*, vol. 34, p. 370.

of these and other facts, and basing its opinion partly on the ground that the cars were not available for back-loading, rendered the following decision:

> As the Burton Stock Car Company does not use cars of railroad companies, cr exchange cars in any manner, but rents them to the public for hire, the refusal of the defendants to pay the same mileage allowed on exchanges of cars between each other does not constitute unjust discrimination.[1]

Although this was a victory for the railroads, the advantage that they gained was but short-lived. They were paying three-fourths of a cent mileage on refrigerator and tank cars at this time, the reason for the difference in the attitude of the railroads lying in the fact that the last two classes were owned almost entirely by shippers to whom the railroads were compelled to cater. They were destined soon to pay the same mileage rate on stock cars. The manner in which the change came about may best be explained in the words of Mr. Midgley:[2]

> One of the largest packers leased a lot of cars in which to forward his purchases of cattle to market, and on those he was allowed the regular mileage that obtained between railroad companies. Private stock-car companies noted the performance and put their cars to a similar use—leasing them to shippers — and as the stock was routed only *via* such roads as would allow the usual mileage—three-quarters of a cent loaded or empty—the practice soon became universal.

The mileage rental on stock cars was subsequently changed

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[1] Burton Stock Car Company *vs*. Chicago, Burlington and Quincy Railroad Company, *et al*. 1 *I. C. C. Rep.*, p. 132. *Cf.* also Midgley, *Railway Age*, vol. 34, p. 369.

[2] *Ibid.*, p. 370.

to six mills per mile, as will be pointed out below, and this is the rate which now prevails.

As the first owners of refrigerator cars were large shippers, they had very little trouble in exacting the regular three-quarters of a cent rental from the railroads. At the very outset there were some instances where they received no mileage, and later they were allowed mileage only on loaded cars. The competition of the carriers for the heavy shipments of the packers was so great, however, that the regular mileage was soon allowed on empty as well as on loaded cars. West of Chicago and St. Louis, the car lines were even more successful, for in that territory they succeeded in securing from the railroads one cent a mile, loaded or empty, a practice which still continues. This came about as a result of the keen competition between the railroads of that section: one road, in order to obtain more traffic, made a contract with a powerful shipper who owned refrigerator cars, to pay one cent a mile on such cars for a period of five years, the car company promising to furnish all the refrigerator cars needed by the railroad. Competing roads naturally followed this move, and it soon became the custom in that territory with one or two exceptions.[1]

From what has been said it will readily be seen that although the railroads were opposed to this payment of what they considered an unreasonable mileage, they were helpless in the hands of the large shippers, and had to yield to their demands. The results of free competition in railroading to secure traffic at any cost is nowhere better illustrated than here. The railroads realized that if they could act in concert against the private-car lines they might be able to reduce the mileage, and in 1894 they made a bold attempt in this direction. For an account of this

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[1] *Int. Com. Rep.*, 1889, p. 16.

movement, we may quote from an article[1] by Mr. J. W. Midgley, the well-known expert in traffic matters, who as a colleague of Col. Albert Fink and George H. Blanchard has achieved considerable distinction, and who, in his series of articles in the *Railway Age*, has given to the public a profound study of the private-car situation. Mr. Midgley views matters from a railroad man's standpoint, and as he took a leading part in this controversy, his account furnishes an authentic as well as an interesting chapter of railroad history.

> Alarmed by the growing numbers and persistent influence of private cars, a movement was inaugurated by western railroads, early in 1894, to restrict the rental therefor to half a cent per car per mile. Eventually ninety-five railroad companies agreed to limit their payments as above for the use of private cars, commencing on August 1st, 1894. This was to be the allowance on loaded or empty cars. In September following, the Southwestern Traffic Association, consisting mainly of lines entering Texas from St. Louis and Chicago, recommended that no mileage should be paid on empty tank, poultry, arms, or other palace cars, but that suggestion did not prevail.
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> Before the reduced rate became effective, a representative of the Union Tank Line Company vainly besought the executive officers of western roads to reconsider their action so far as tank-line cars were concerned. The same party then induced the commissioner to meet with the Union Tank Line Company in New York, but that conference was likewise without avail, except that a meeting between a committee representing western railroads and the aforesaid tank-line company, in New York, was promised. This occurred early in October.
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> Meanwhile, a conference with a committee of Eastern railroad presidents had been arranged. Six vice-presidents of western roads, together with the undersigned, attended, and

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[1] *Railway Age*, vol. 34, p. 401.

the result was a recommendation that, taking effect on November 1, 1894, the mileage rate for the use of freight cars should be six mills per car per mile, provided, that if contracts existed at higher rates, those should be reported, and roads so desiring be permitted to meet the same; otherwise, it was declared they should not share in the traffic. The reference was to refrigerator and tank-line cars. Upon the former, it was intimated, three-fourths of a cent and one cent per mile, and on the latter three-fourths of a cent per mile were assured, by contracts with certain roads.

Next day the western committee met the Union Tank Line Company. The railroad gentlemen were told that unless they would restore the mileage of three-fourths of a cent, loaded or empty, on tank cars, they would get none of the Standard Oil Company's shipments to Saint Paul and Minneapolis or to Missouri River points; that the weakest road (in moral stamina) which could be found would be selected, and all shipments of oil, *etc.*, to the destinations named would be concentrated thereon, whereupon other lines, it was predicted, would soon cry out for Standard Oil business, which they would not get until they agreed to restore the concessions heretofore granted.

Thinking to offset that attitude, one vice-president remarked that the railroads were large purchasers of oil for illuminating and lubricating purposes, and that boycotting such as was threatened by the U. T. L. Company might compel the railroads to buy oil elsewhere. To this the curt reply was made that the railroads were at liberty to purchase where they chose, that the Standard substantially controlled the oil production of the country, and that adequate supplies thereof could not be had from other producers.

This summarily ended the conference. A "weak sister" (as the U. T. L. officer had aptly termed the erring one) was found; all the Standard Company's oil shipments during the next month to the twin cities and to Missouri River points were thrown upon this particular road, because of its agreement to allow three-quarters of a cent per mile, loaded or

empty, which diversion so adversely affected the earnings of another company that a conference of interested parties was demanded. This was held in Saint Louis on October 16, 1894, when surrender was made by the adoption of the recommendation hereinbefore recited, namely, that the mileage-rate on freight equipment should be six mills per car, unless there were existing contracts at higher rates, in which event "all lines shall be at liberty to meet the mileage rates enforced by such contracts." The contract already described with the U. T. L. Company operated to restore the rate of three-fourths of a cent per mile on tank cars, loaded or empty, and no subsequent attempt has been made to modify that arrangement.

Supplementing the foregoing, it may be stated that the leading packer and refrigerator-car owner, during the progress of the meeting last described, telegraphed strongly advising that the mileage on refrigerator cars be made not less than three-fourths of a cent per car per mile instead of half a cent, as was originally contemplated, thereby signifying his willingness to accept three-fourths of a cent in lieu of one cent per mile, which had long before, and has since, prevailed west of a meridian drawn through Chicago. The undersigned read the message referred to, therefore learned its precise contents. Suffice it to say that the signer of the message was able to speak for all privately-owned refrigerator cars; but there was such intense feeling in view of the coercion exercised in the matter of tank cars that further efforts to resist the demands of large shippers who were also owners of private cars were abandoned.

In his testimony before the Interstate Commerce Commission in 1904,[1] Mr. Midgley enlarged on one or two points mentioned in the above recital. In speaking of the "weak sister" incident, he says that immediately after the conference with the Union Tank Line during which they

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[1] I. C. C., Oct. 1904, *Hearings*, p. 15.

had threatened to single out some road which would allow the regular mileage, he met Mr. A. B. Stickney, president of the Chicago Great Western Road, and told him of the interview. Mr. Midgley says:

> He was a party to our agreement. His line had never carried a car of oil before that time for the Standard Oil Company. He went right up there and made a contract allowing them three-quarters of a cent for their tank cars, and then gave me notice that he thought it was severe treatment that we had imposed and that we ought to meet the rate. He got all the oil for a month or two. The other lines didn't get one carload to St. Paul, Minneapolis, or the Missouri River. It made a great hole in their earnings and they called for another meeting.

Then came the St. Louis conference, and the yielding on the part of the railroads. During the same year another conference in New York compromised on the mileage rates, making it six mills per car per mile, including stock cars and railroad cars, but excepting refrigerator and tank cars. Thus the only result of this agitation, so far as the private-car companies were affected, was the reduction of the mileage on stock cars alone, from three-quarters of a cent, to six mills per mile. This rate on stock cars continues today.

The mileage rentals of private cars have undergone but little change since 1894. In 1896 the Interstate Commerce Commission issued an order to all common carriers, requiring them to report the amounts paid by them to private-car companies, individuals or firms for the use of cars other than those owned and operated by railroad companies for the year ending June 30, 1895. Replies were received from 1498 railroad companies. 350 reported mileage payments, which were distributed among 854 different companies, and 1148 railroads disclaimed any such payments. The 350

railroads reporting payments included all the important lines of the country; the majority of the 1148 roads disclaiming payments were unimportant lines, and the operations of many of them were included in the reports of the larger companies. The amounts paid by the various railroads, and also the amounts received by the private companies, were published in the annual report of the Commission for 1896.[1] Although these figures were to a certain extent invalidated by the inclusion of payments to such companies as the Merchants' Despatch Transportation Company, the American Refrigerator Transit Company, and numerous fast-freight lines which really belonged to the railroads, some of the results of this report are worth quoting. The total amount paid by the railroads for mileage for the year ending June 30, 1895, was $11,261,328.61. Of this, $2,517,302.68 was for passenger cars, and $8,744,025.73 was for freight cars. Payments to fast-freight lines and other companies which were really owned by railroads would cause a deduction from the above of about $1,000,000. The prevailing rates of mileage on freight cars, as reported by the railroads, were six-tenths of a cent, three-fourths of a cent, and one cent a mile; in a few cases they were one-half of a cent, two-fifths of a cent, and one-quarter of a cent. The various Armour lines received upwards of $1,000,000 or one-eighth of the whole, and the Swift and Company lines nearly $900,000.[2] It would appear from the report that there were about 130 private refrigerator-car lines receiving mileage from the railroads at that time.

Estimates of the earnings of private cars on the mileage

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[1] Appendix D, *Int. Com. Rep.*, 1896.

[2] According to figures furnished to the Wisconsin Tax Commission in 1907, the Armour Company received during the previous year over $2,500,000 in mileage rentals.

bases referred to above, will be given later. According to the expressions of opinion of many railroad men, the railroads have continued to chafe under the present system of mileage rental, but no important attempts have been made to reduce it.

In 1902 the *per diem* method of settling balances for interchange of cars owned by railroads was introduced, but private cars were allowed to continue under the old system. Question immediately rose as to what basis of payment should be used for the special-equipment cars of those companies which belonged to certain railroads. The Merchants' Despatch Transportation Company, belonging to the Vanderbilt system, and the American Refrigerator Transit, belonging to the Gould roads, announced that their cars would continue on the mileage basis. This involved the question as to what, strictly speaking, is a private car. According to the definition given by the American Railway Association, a private car is one "having other than railroad ownership," and it was the evident intention at the time of the formulation of the *per diem* code, that such cars as those above referred to, should not be classed as private cars. An appeal was made to the arbitration committee of the American Railway Association to decide the status of the cars belonging to these companies which were affiliated with railroads, and which had not been ordinarily considered as private cars. This was never decided, because the committee made a ruling at its next meeting that this question would not be considered, except on written application of both parties to the controversy,—namely, the owner of the cars, and at least one railroad over which they passed.[1] As the owners of the cars naturally did not wish to join in such a request to have their ac-

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[1] Midgley, *Railway Age*, vol. 34, p. 678.

tion in continuing them on a mileage basis reviewed, nothing was done. In the meantime, the Pennsylvania, the Erie, and the Baltimore and Ohio made unique arrangements with their connecting lines, allowing them to settle for refrigerator cars on either the *per diem* or the mileage basis, whichever they found to be the cheaper in each separate case. This arrangement has existed nominally to some extent ever since. The Santa Fe Refrigerator Despatch followed the example of the Merchants' Despatch, as did many other companies, and placed their cars on a mileage basis. The result of all this was, that in addition to the 120,000, or so, private cars then in existence, there were thousands of other cars, really belonging to railroad companies, which were continued on the mileage basis.

A partial summary of the foregoing, together with some exceptions and additions, will afford a more definite idea as to the actual mileage rentals being paid at present. Refrigerator cars earn three-quarters of a cent a mile, loaded or empty, east of Chicago, with few exceptions, the most notable of which is the payment of one cent a mile by the Grand Trunk on beef shipments from Chicago to the east by way of Montreal.[1] Some other roads pay one cent a mile on refrigerator cars containing dressed meats, but only three-quarters of a cent on cars containing fruit or other commodities. The Wabash, for instance, has a contract with Swift by which it pays one cent a mile for his cars.[2] Again, in New England, the Boston and Maine pays

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[1] Mr. Robbins, President of the Armour Car Lines, explained this by stating that the mileage had been at one time three-fourths of a cent over the Grand Trunk, and that there had been a differential of two cents a hundred in the freight rate, but that on the removal of the differential the extra mileage had been substituted. *Cf.* testimony before House *Committee on Interstate Commerce*, Feb. 13, 1905.

[2] I. C. C., Oct., 1904, *Hearings*, p. 179.

one cent a mile on cars containing dressed meats, and three-fourths of a cent on all other refrigerators.[1]

Between the meridians drawn through Chicago, and the Rocky Mountains, refrigerator cars command generally one cent a mile, loaded or empty, there being some exceptions where three-quarters of a cent is paid on fruit and dairy cars. The contract that the Armour Lines have until recently had with the Southern Pacific showed the greatest exception to the usual practice. According to this, the railroad paid six mills per mile, and only on loaded cars; in the case of deciduous fruits from Northern California, the road paid mileage on neither loaded nor empty cars.[2] The only source of revenue for the car line in this particular traffic, therefore, was from the charges it levied for refrigeration. West of the Rocky Mountains, the general mileage rental seems to be three-fourths of a cent on loaded cars only.[3]

Tank cars receive uniformly three-quarters of a cent, and stock cars generally six mills per mile loaded or empty, throughout the country. Coal cars owned by private companies receive three-fourths of a cent as mileage rental.

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[1] Testimony of President Tuttle before Senate *Committee on Interstate Commerce*, April 20, 1905. (The *Hearings* of this Senate Committee in 1905, published in five volumes, will be referred to *infra* as Elkins Committee *Hearings*.)

[2] *Cf.* Armour-Southern Pacific Agreement, Elkins Committee *Hearings*, vol. iii, p. 2412.

[3] Midgley in I. C. C., Oct., 1904, *Hearings*, p. 7.

CHAPTER IV

CONTRACTS BETWEEN PRIVATE-CAR COMPANIES AND THE RAILROADS

IN the historical survey of the system of mileage payments certain contracts between private-car companies and railroads have been referred to as playing an important part in fixing the amount of the rental. For instance, some powerful shipper owning cars would make a contract with a railroad, guaranteeing to the road a certain amount of traffic, and would receive in return a promise of a certain mileage,—the agreement to hold good for perhaps three years or more. If that mileage payment happened to be higher than the prevailing rate competing roads would be forced to grant the same rate, and by the time the first contract had expired the custom of paying the increased rate would have become established throughout the territory affected. Although mileage rentals for private cars have changed but little during the last few years, there are different forms of contracts which must receive attention in any study of the relations between car companies and common carriers. These contracts may be roughly classified into three groups: first, agreements between shippers owning private cars and railroad companies, in which the shippers usually promise a certain amount of traffic and the railroad companies fixed mileage rates and also maximum freight rates on goods transported; second, contracts between private-car companies (which are not also shippers)

and railroads, in which provision is made for the payment by the railroad of certain commissions on the freight rates, over and above the regular mileage rentals, on goods transported in the car companies' cars over the lines of the railroads; and third, contracts by which the railroad promises to use exclusively the cars of one particular private company for some particular class of traffic. This last is the well-known exclusive contract, about which so much has been said and written.

As for the agreements between shippers and railroads, those of the large packers offer the best illustrations. For instance, Schwarzschild and Sulzberger, operating refrigerator cars under the name of the Cold Blast Transportation Company, have a contract with the Chicago and Great Western Railroad, in which the packing company agrees to give to that road fifteen per cent of its total tonnage from the Missouri River to Chicago, and the railroad in return guarantees the regular mileage payment of one cent a mile, and also a maximum freight rate of eighteen and one-half cents a hundred. The contract now in operation was made in 1903, and was to run seven years from date.[1] Swift and Company have contracts with the Pere Marquette, Grand Trunk, Wabash, Chicago and Great Western, and the Canadian Pacific Railroads. In some cases the packing company agrees to ship a certain number of cars over the contracting railroad (as, for instance, forty a week over the Pere Marquette), and in other cases it promises a certain proportion of its total tonnage (as, for instance, fifteen per cent over the Great Western). The railroads, in turn, guarantee mileage rentals and maximum freight rates, and the contracts extend over five or seven year periods.[2] It has been testified before the Interstate Com-

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[1] I. C. C., Oct., 1904, *Hearings*, p. 167.

[2] *Ibid.*, p. 177.

merce Commission that almost all the packers have similar contracts with the Pere Marquette, as well as with numerous other roads. The examination of witnesses by the Commission did not bring to light any illegal practices in connection with these contracts, such as special favors, discriminations, or rebates. They are evidently made merely as a guarantee of the continuance of certain business relations, although they stand seriously in the way of any concerted action among the railroads towards the reduction of mileage rentals, and have undoubtedly been used as a means of hammering down freight rates on dressed meats.

The second class of contracts, those in which a certain percentage of the freight rate is paid as a commission by the railroad to the car company, involves a more serious question. For, if the car company is also a shipper, the commission may amount to a rebate. In the majority of cases, however, this question does not arise, because the car companies appear to have no other interests than the solicitation of freight to be carried in their cars. A good example of this is the contract between the Missouri River Despatch, a refrigerator line of about 250 cars engaged in handling poultry and dairy products, with the Erie Railroad, in which the railroad agrees to pay in addition to the regular three-quarters of a cent mileage, a commission of 12½ per cent of the freight rate, and the car company, in turn, promises to ship only over that line.[1] The object of the railroad in making the contract, as stated by the Erie traffic manager, was to secure additional business.[2] According to testimony before the Interstate Commerce Commission, the car line is not an owner in any way of the commodities shipped, and it was further brought out that the manager of the refrigerator line had for years been in the

[1] I. C. C., Oct., 1904, *Hearings*, p. 94.

[2] *Ibid.*, p. 101.

traffic department of the Erie Railroad prior to his connection with the car line, and that in his latter capacity he might be considered as a solicitor of freight for the railroad, although not on the pay roll of that company. Other refrigerator lines which have contracts similar to this one, are the New York Despatch, which receives 12½ per cent commission on dairy products from the Grand Trunk and Central Vermont, and 10 per cent from the West Shore,[1] and the Dairy Refrigerator Despatch, which receives 12½ per cent from the Lackawanna.[2]

There are some of these contracts, however, which deserve special attention. The most important is that of the Milwaukee Refrigerator Transit Company which has a contract with the Erie in accordance with which it receives a commission of 12½ per cent on the freight rate. Although the car line is a separate corporation, it is owned exclusively by the Pabst Brewing Company people, who make their beer shipments in its cars. It is evident that under this arrangement the payment of a commission amounts to a rebate. This important case will accordingly be treated at greater length in the chapter on discriminations and rebates.

The class of contract that has attracted the most attention is the so-called exclusive contract, in which the railroad agrees to use the cars of a certain private company and no others for some particular kind of traffic, generally fruit. The railroad also guarantees the payment of mileage, and the car company agrees to furnish a sufficient number of cars, and to attend to the icing, for which it makes a charge to the shipper. This form of arrangement has been severely criticized by the agitators against private-car companies on the ground that it grants to the car line an ab-

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[1] I. C. C., Oct., 1904, *Hearings*, p. 155.

[2] *Ibid.*, p. 156.

solute monopoly, with the result that it may charge whatever it sees fit for the icing service. A discussion of the merits and demerits of exclusive contracts necessarily deals with those of but one private-car company, the Armour Car Lines, which has contracts with some twenty or thirty different railroads, and which has ousted other private lines from most of the important fruit-growing sections.

This policy of making exclusive contracts was begun by the Armour Company in 1897 when it entered into an agreement with the Southern Pacific for the carriage of fruit from California to the East.[1] In 1898 the Central of Georgia made such a contract with the Armour Lines for the handling of the Georgia peach crop. This policy was followed by other southern railroads, including the Southern Railway, Atlantic Coast Line, and the Seaboard Air Line, until it soon came about that Armour handled practically the whole of the fruit and berry crop of the South Atlantic States,—a condition which continues today. Likewise, in Michigan, the Armour Company has had exclusive contracts with the Michigan Central and Pere Marquette Railroads, and these have been the most vigorously attacked, because the icing charges were raised enormously at the time the contracts were made in 1902. The Interstate Commerce Commission investigated the Michigan matter in May, 1904, with the result that the Michigan Central discontinued its contract, while the Pere Marquette declared its intention to lower icing charges for the season of 1905, although still operating under the exclusive contract, and for the season of 1906 to purchase or lease equipment of its own.[2] Subsequently, however, the Pere Marquette went into the hands of a receiver, and under the supervision

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[1] Elkins Committee *Hearings*, vol. iv, p. 3658.

[2] *Int. Com. Rep.*, 1905, p. 121.

of the Honorable Judson Harmon, the contract with the Armour Company was renewed. We shall have occasion to refer frequently to this Michigan case.

These exclusive contracts have been denounced as secret. In a certain sense the charge is true in that they have not been filed with the Interstate Commerce Commission, and in that there have been until recently no means of knowing what their terms were. During government hearings, however, copies of some of these contracts have been submitted in testimony, and the text of the Pere Marquette-Armour contract of 1902-1905 is here offered as typical.

CONTRACT BETWEEN THE PERE MARQUETTE RAILROAD AND THE ARMOUR CAR LINES.[1]

This agreement, made and executed in duplicate this 23d day of December, A. D. 1902, by and between the Armour Car Lines, a corporation organized and existing under the laws of the State of New Jersey, hereinafter known as "The Car Line," party of the first part, and the Pere Marquette Railroad Company, a corporation organized and existing under the laws of the State of Michigan, hereinafter known as "The Pere Marquette," party of the second part.

Witnesseth: That for and in consideration of the sum of one dollar ($1.00) by each of the parties hereto to the other in hand paid, the receipt whereof is hereby acknowledged, and in further consideration of the mutual covenants and agreements hereinafter set forth to be kept and performed by each of the parties hereto, it is hereby agreed as follows:

1. That the Car Line agrees to furnish to the Pere Marquette at some point or points on the Pere Marquette lines properly constructed fruit cars lettered "Fruit Growers' Express," "Kansas City Fruit Express," or "Continental Fruit Express," sufficient in number and furnished in such order as to carry with reasonable dispatch the fruit which the Pere Marquette shall be tendered by shippers during the life of this contract; and the Car Line agrees to keep said cars properly iced and under refrigeration, so as to protect fruit in carloads while in transit over the lines of the Pere Marquette and to destination.

2. The Pere Marquette agrees and obligates itself to use the Car Line's equipment exclusively in the movements of fruits under refrigeration from points on its leased and operative lines, except the Detroit and

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[1] Elkins Committee *Hearings*, vol. 1, p. 317.

Lake Erie Railroad in Canada, during the term of this contract, excepting from Grand Rapids, Michigan, and excepting in the case of such shipments of fruit as are destined to points on the lines of the Pere Marquette, and to Milwaukee, Wisconsin, and Manitowoc, Wisconsin, for which shippers may request Pere Marquette system refrigerators as are in suitable condition, as the Pere Marquette may elect, shall be used in the handling of said fruits when the same are destined to points beyond the Pere Marquette Railroad;[1] but in that event the Car Line's regular refrigerator charge, as indicated hereinafter, is to be applied and the shipments iced and handled under the supervision of the Car Lines.

3. The Car Line agrees to erect icing platforms at Grand Rapids and St. Joseph, Michigan, and provide other convenient facilities for the proper icing of cars used in the business referred to.

4. The Car Line's charges to be made for superintending, loading, furnishing refrigeration, and handling the business generally, under its supervision in any cars used for same, not to exceed on peaches and plums the rates shown in Car Line's tariff number 296, in effect August 1st, 1902, hereto attached and made a part hereof, and not to exceed on green apples, green pears, and grapes the rates shown in Car Line's tariff number 297, in effect August 1st, 1902, hereto attached and made a part hereof. It being understood and agreed that the Car Line's charges from Pere Marquette stations in Michigan shall in no case exceed charges made by the Car Line for refrigerating similar fruits from stations also situated on the lines of other roads in Michigan. The Car Line's charges referred to shall be billed as advance charges on each carload and shall be paid to the Car Line by the accounting department of the Pere Marquette monthly, it being understood that in event property is refused and sold at destination, through no fault of the railroad companies interested, or the Car Line, that the Car Line will join the railroad companies in prorating on a revenue basis any deficiency between the amount of transportation charges and proceeds of sale that may exist. In case consignees refuse to pay refrigerating charges, and agent at destination is unable to collect the same, the railroad shall be reimbursed for the amount advanced to the Car Line.

5. The Pere Marquette shall pay the Car Line three-quarters (¾) of one cent per mile run by each car of the Car Line used in said refrigeration service, both loaded and empty, except on such cars as may be left over at the end of the season in shipping districts and hauled empty to connections, as provided for in the last sentence of this paragraph, while in service upon the lines of the Pere Marquette, and furnish free transportation over its lines for the use of represen-

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[1] This confused wording appears in the agreement as reprinted in Elkins Committee *Hearings, op. cit.*

tatives of the Car Line engaged in looking after the fruit movement referred to, including permits to ride on freight trains, on the condition, however, that the Car Line shall (and it hereby agrees to) indemnify, protect, and save the railroad company harmless from any loss, damage, or expense on account of any claim against the railroad company growing out of injury sustained, or claimed to have been sustained, either in person or property, by any employee or agent of the Car Line receiving such free transportation over the lines of the railroad under the provisions of this contract, whether or not such injury is due to the negligence of the Pere Marquette or its employees. And the Pere Marquette also agrees to instruct its agents to obtain by wire from the officers of the Pere Marquette such information as may be requested by the Car Line's representatives. The Pere Marquette further agrees to deliver promptly any cars left over at the close of the season to such connections as are indicated by the Car Line, provided the Car Line shall not ask the Pere Marquette to haul its empty cars further than the junction point at which cars were received.

6. The Pere Marquette agrees to sell the Car Line such quantity of ice at Selby, Ionia, Ludington, and Saginaw as the Pere Marquette can reasonably spare, from time to time, if required by the Car Line, on basis of not to exceed two dollars ($2.00) per ton in bunkers of cars.

7. The Car Line agrees to assume all liability for, and promptly adjust and pay, and indemnify and save the Pere Marquette harmless from claims arising from any failure on its part to properly ice and keep iced said refrigerator cars furnished and supplied by it as aforesaid to the Pere Marquette.

8. This contract to become operative the date of its execution and terminate November 1st, 1905.

In witness whereof the said parties have hereto caused this contract to be executed in duplicate by their proper officers the day and year first above written.

Armour Car Lines,
By ——— ———.
Pere Marquette Railroad Company,
By ——— ———.

One of the leaders of the agitation against private-car abuses has been the National League of Commission Merchants, which, in 1904 appointed a special committee, known as the Refrigerator Car-lines Committee, with Mr. John C. Scales of Chicago as chairman. Mr. Scales wrote the articles that appeared in the *Saturday Evening Post* in 1906 in answer to those of Mr. J. Ogden Armour, which attracted

wide-spread attention at the time. This committee expressed its views on the question of exclusive contracts in its first annual report, dated January 11, 1905, as follows:

> Starting with only vague rumors of the existence of exclusive contracts between the Armour Car Lines and numerous railways, the initial work of your Committee was necessarily constantly and greatly hampered for want of exact knowledge, but persistent and unremitting effort at last unearthed a condition of affairs relating to the icing and transportation of the perishable food products of the country, scandalous and appalling beyond belief. It has been established by a great mass of incontrovertible and unimpeachable evidence, that the exclusive Armour contracts provide that the railway entering into the same shall haul none but Armour cars, but if cars other than Armour be hauled, that the Armour charge shall apply. The effect of this provision of the contract has been the annihilation of competition, which has enabled the Armour Car Lines to charge any price they saw fit for icing, reaching in many instances to over four hundred per cent above the actual icing cost. The investigations have further shown that the practical Armour monopoly of the meat products of the country, enabling that and affiliated firms to offer to the railroads the largest freight tonnage in the world of any one commodity, has been one of the most potent agencies used in forcing the railways into these exclusive contracts. The word from the Armour Car Lines to the railways has been: make this contract or you get none of our freight.

As will be seen from the above, the principal grievance is the fact that Armour had been given a practical monopoly in the fruit business in certain parts of the country, and that this monopoly had resulted in unreasonable icing charges. Certain it is, that in the Michigan territory, these charges were raised enormously in 1902 when Armour first operated there under an exclusive contract. Although it is not our purpose to discuss in this place the reasonableness

of icing charges,[1] it is safe to say here that if these charges were unreasonable, the fact was undoubtedly due to exclusive contracts. In this particular case the Interstate Commerce Commission expressed its opinion that the charges were exorbitant, and that the exclusive contract was mainly responsible therefor:[2]

> Acting under the contract, the Car Lines Company exacts charges for the refrigeration service which greatly exceed those formerly made to cover the cost of icing by the railroad companies, and range from 50 to 150 per cent above those made prior to the contracts by the Car Lines Company itself. The total cost of transportation to the shipper has been thereby very largely increased. *Held,* That the railroad companies, by making these exclusive contracts, in effect impose upon shippers exorbitant charges for the transportation of Michigan fruits to markets in other states in violation of section one of the act to regulate commerce.

Naturally, since the excessive icing charges appear to have been a direct result of monopoly power, the idea of monopoly itself is attacked. It may hence be asked: Is not the exclusive contract opposed to the spirit, and even to the letter of American legislation and ideas? If private-car companies are allowed to operate over the railroads at all, why should such lines not be allowed on every railroad? Is it right for a shipper to be forced to use the cars of one private-car line, and pay the charge arbitrarily fixed by that line, when he might otherwise furnish a car, either by leasing it or building it himself, and obtain suitable service, at a much less expense? The fact that Armour and Company have such a hold on the packing business readily suggests the complaint that they use this power to force favorable contracts from the railroads for their fruit cars. And

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[1] *Cf. infra,* Chap. V.

[2] *Int. Com. Rep.*, 1904, p. 301.

although this has nothing to do with the question as to the legality or advisability of allowing such contracts, there is undoubtedly good reason for the belief that Armour has been able to arrange terms much more advantageous to himself than if he were not a powerful shipper.

Fruit growers in California made a similar complaint in 1906,—that refrigeration charges were exorbitantly high. The California Fruit Growers' Exchange, a coöperative organization representing over 3,000 growers, and shipping annually about 14,000 cars, drew up resolutions declaring that Armour icing charges were exorbitant, and alleging the existence of an exclusive contract as the reason thereof. The interesting fact about these resolutions is that they were inspired by the series of articles by Mr. Armour in the *Saturday Evening Post,* in which he made the statements that the agitation against private cars was being carried on solely by commission merchants in the large cities, and that there had been no complaints from the shippers themselves.

One other objection urged against exclusive contracts is that they prevent the railways from increasing their refrigerator-car equipment—a fact which is brought forward by those who look for a solution of the problem in the direction of railroad ownership of all special-equipment cars. As has been shown before, the number of refrigerator cars owned by the railroads has been rapidly increasing during the last few years but these have been built mainly for the carriage of dairy products, and many of the largest fruit-carrying roads have not built a single car for that traffic. Notable exceptions to this have been cited in Chapter I. As the fruit traffic is increasing by leaps and bounds, it is becoming more and more difficult for the railroads to step in and provide the necessary number of cars, and the exclusive Armour contracts act as an impediment to their doing so gradually.

Still another argument urged against exclusive contracts in this connection is that it is more difficult for railroads who do own refrigerator cars to find use for them on other lines when they do not need them themselves. During certain periods of the year, between fruit seasons, a railroad may have very little use for its fruit cars, and often allows them to run on roads in other parts of the country where they are needed. The existence of Armour contracts necessarily makes it more difficult to do this, and tends to discourage the building of such cars on the part of the railroads.

Although the case against exclusive contracts may seem fairly strong, there is a great deal to be urged on the other side of the question. Officers and attorneys of the Armour Company have had to defend their position practically alone, although they have been assisted by the testimony of some railroad men, and also by numerous fruit growers. In the first place, it has not always been the case that icing charges have been increased under the operation of exclusive contracts; sometimes, indeed, they have been lowered. In California, for instance, the charge for icing from Sacramento to Chicago was $125 a car. When the contract with the Southern Pacific was made, the charge was reduced to $90 a car. In 1899 it was reduced so as to apply to more weight and in 1900, a further reduction to $80 a car was made, making a total reduction of 41 per cent from the rate before the exclusive contract was made.[1] Again, in Georgia, previous to 1898, there were five competing car companies and the rate of refrigeration from Georgia common points to New York was $90 a car. When the exclusive contract was made, the rate was fixed at $80,

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[1] Testimony of George B. Robbins, President of Armour Car Lines, before House *Committee on Interstate Commerce*, Feb. 4, 1905.

and in 1901 "voluntarily" reduced to $68.75 a car. It may be well to suggest in passing, however, that prior to exclusive contracts, when there was competition among different car lines, the practice of rebating was prevalent in both of these sections, especially in California,—and this fact is admitted by car-line men and shippers alike,—so that although there was a substantial reduction from the formal tariff, it may not have been so much of an actual reduction.

The strongest argument for the exclusive contract lies in the improved character of the service rendered to fruit shippers, both as to availability of suitable cars, and as to character of the icing service. There has been conclusive evidence that the service in California when there were a number of competing car lines, was very unsatisfactory. Although five different refrigerator-car lines were operating there, yet scarcely a year elapsed without a shortage of cars at some time during the season, resulting in considerable loss to the growers. The competition among the various lines was very keen and large rebates on the refrigerator charges were made to the heavier shippers as inducements to use a particular line of cars. This state of affairs was of course deplorable, especially on account of the discrimination against the small growers, and on account of the general demoralizing influence on the fruit industry. The division of the business among these five different companies did not justify any one of them in going to the expense of erecting adequate icing stations and putting into operation a complete system of supervision, such as is needed for the handling of perishable fruits. Furthermore, no company could tell just how many of its cars would be needed during the season, and as these cars have to be "parked" or concentrated at shipping points before the opening of the season, constant errors were made in

calculations, with a consequent shortage of cars at various times.

Since Armour has been granted an exclusive contract, however, all this has changed. The car line has been able to estimate the number of cars needed, and as it has been sure of the traffic, it has erected ice-houses, sent inspectors into the field, built repair shops for its cars, and given exceptionally good service. To quote from a report issued by the Sacramento Chamber of Commerce in 1903,—

> Therefore, in the judgment of your committee, better and cheaper refrigeration can be obtained by the fruit growers and shippers of California when operating with one line, where they are sure of first-class service and constant care of their fruit from the time it leaves California until it arrives at its destination, than they could by trusting to several refrigerator companies, no one of which could afford to provide as ample an equipment and equal service.[1]

Much the same story is to be told with regard to the conditions in Georgia before and after operation under an exclusive contract. In 1895, when the peach crop of that state was more than three times as large as the crop of any previous year, there were five refrigerator-car companies competing for the business,—namely, the California Fruit Transportation Company, International Fruit Dealers' Despatch, California Fruit Express, American Refrigerator Transit Company, and the Armour Car Lines, each one having contracts with individual growers to use its cars. None of these companies had ice-storage houses in the fruit district, but relied on the ice factories of Macon, Atlanta, and neighboring towns, to supply ice as needed. The exist-

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[1] Submitted to House *Committee on Interstate Commerce*, Feb. 13, 1905. This report gives a good description of the conditions in California as outlined above.

ence of so many lines, each with a separate supply of ice, which had to be placed in the bunkers of the cars at different points, resulted in a large amount of unnecessary handling and switching of cars, as well as delay, interruption, and confusion. Before the season had progressed very far, the ice supply ran short, and a famine was threatened, with imminent danger of loss to shippers. Sometimes one car line would have a supply of ice, sometimes another, while the others would be without, and the company having ice would get all the business for a day or two. No company could be assured of any regular business from day to day, and the supply of cars was uncertain. Neither did the various lines have adequate facilities for re-icing en route, and many cars reached market poorly iced.[1]

In view of these unsatisfactory conditions, the Central of Georgia Railroad, on whose lines the bulk of the Georgia peach crop originates, took steps to make some arrangement for the better handling of the crop, and addressed inquiries to some of the principal growers, asking them to state which refrigerator line they preferred. The answers to these requests were few in number and otherwise unsatisfactory, so the railroad decided to continue the competitive régime. The crop of 1896 was poor, and although the volume of business was less than half that of the preceding year, there was another ice famine with its attendant confusion and dissatisfaction. In 1897 the peach crop was a failure, and very few cars were shipped from the state.

The season of 1898 was very favorable to the peach industry, and the Central of Georgia Railroad viewed with apprehension the approach of the shipping season, and be-

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[1] Testimony of J. H. Hale before House *Committee on Interstate Commerce*, Feb. 8, 1905.

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gan once more to prepare for some arrangement whereby the crop could be adequately handled. It realized that local supplies of ice could not be relied on, and that it was necessary to have a large amount stored up in advance. It therefore turned to the private-car lines, and found in the first place that no line would pledge itself to make the necessary arrangements without an exclusive contract.[1] The railroad decided that this was reasonable, because it meant: first, the purchase and storing of an enormous quantity of ice in the peach district, and at the various re-icing stations along the route to market; second, the building of storage houses for this purpose; third, the erection of re-icing platforms; and fourth, the organization and maintenance of a force of employees to look after the loading, icing, and re-icing. Accordingly, an arrangement was made with the Armour Lines, as that company was found to be the best equipped for the service, and submitted to the principal growers. It is reported that at least ninety per cent of them were interviewed, and though there was some opposition, the majority of the growers favored the idea, believing that service was the all-important point to be considered. Accordingly the exclusive contract was definitely entered into in May, 1898.

Even though the Armour Company did not have time to build storage houses, it contracted for all the ice it could procure in Georgia (where ice is artificial), and also shipped train-loads of natural ice from the northern states. The result was that the service was highly satisfactory, and the crop which was the largest in the history of the district, was handled much better than it had ever been before. The Armour interests furnished an abundance of evidence be-

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[1] *A History of the Peach Industry in Georgia*, compiled by the Central Railroad of Georgia.

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fore the Senate and House Committees on Interstate Commerce in 1905, both through the actual appearance of fruit growers and also through numerous letters, to show that the fruit raisers of Georgia were extremely well satisfied with the arrangement. Furthermore, such testimony has not been confined to the shippers of the Georgia district, but much of it has come from other sections, including the Michigan fruit belt, where the agitation against the car lines has been the fiercest.

It is not to be understood, however, that this praise of the Armour service under exclusive contracts has been by any means universal among fruit growers. It may be well to mention in this connection a fact that the Refrigerator Car Lines Committee of the National League of Commission Merchants brought out in its annual report for 1905. Speaking of the Interstate Commerce Commission's investigation of the Michigan situation, it said:

> A large number of witnesses was in attendance from all parts of the country,—all witnesses on behalf of the people giving their time and paying their own expenses of every kind, including transportation and hotel bills, while the witnesses on behalf of the Armour Car Lines had all their expenses paid by that corporation, including transportation and hotel bills, and in addition thereto a *per diem*.

This fact undoubtedly accounts for the existence of so much testimony in favor of Armour, both in this, and in other investigations, and there would probably have been many more witnesses to denounce the car-line practices, if there had been someone to pay their expenses, *etc.* Nevertheless, those that have testified against the car lines have complained of the icing charge, and only rarely of the service rendered. In the vigorous attack made by the California

Fruit Exchange in its set of resolutions, nothing was said of the service. To be sure, one important grower from Georgia testified to the Senate Committee on Interstate Commerce that the Armour service had been very unsatisfactory in Northern Georgia,—that there had been shortages of cars, poor icing, and that some old, small cars had been furnished which would not hold the minimum load required.[1] There have been other complaints of this character, but they have been comparatively few in number, and it is safe to say that the substitution of the exclusive contract with Armour, for the old system of competition, has resulted in a vastly superior service.

Not only have various fruit growers expressed satisfaction with the Armour service under an exclusive contract, but there have been instances where they have actually solicited the railroads to make such contracts. For instance, the traffic manager of the Atlantic Coast Line, which carries a large part of the strawberry crop of North Carolina, testified before the Interstate Commerce Commission as follows:

> The first contract made with the Armour Company, which was executed in 1898, was made by the Atlantic Coast Line Railroad Company at the request of the Eastern Carolina Truck and Fruit Growers' Association. This association has a membership of about 1,000, representing possibly 80 or 85 per cent of the shipments moved. The secretary of that association furnished us with a copy of the following resolution adopted by the board of directors of the association: "Whereas, the Atlantic Coast Line has requested the Eastern Carolina Truck and Fruit Growers' Association to invite bids for refrigeration service; whereas various bids have been submitted; therefore, be it resolved that these various bids be turned over to the officers of the Atlantic Coast Line, and

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[1] Elkins Com. *Hearings*, vol. i, p. 392.

that they be informed of our preference for the Armour Line."[1]

Likewise, the traffic manager of the Southern Railway, which did not make an exclusive contract with Armour until 1903, having been opposed to such a practice up to that time, said, after describing the unsatisfactory conditions on his line under the competitive régime: "And so, altogether, the arrangement was unsatisfactory, certainly so far as our line was concerned, and the shippers themselves finally all expressed a preference for the Armour car."[2]

It may be well to add a word as to the attitude of the railroads toward the practice of entering into exclusive contracts with private-car companies. Needless to say, they have been actuated by a desire to build up the traffic in perishable freight along their lines, and for this reason have been anxious to give as efficient and as reasonable a service as possible. As has been shown above, various railroads, after allowing a number of private lines to compete, have come to the conclusion that the results aimed at could be best attained by giving all the traffic to a single car company. The reason that Armour and Company have in all important instances been granted this contract is that that company has had for years far and away the best and largest equipment, and the most complete system for looking after the buisness. As an officer

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[1] The growers in this instance had had an unfortunate experience in using the cars of an inferior company the previous year, and were at first in favor of having two or three competing companies, but on the advice of the railroad, they decided they did not want more than one, and entertained bids as above. Three or four different companies responded with bids. *Cf.* testimony of H. M. Emerson before Interstate Commerce Commission, Oct. 18, 1905.

[2] Testimony of L. Green before the Interstate Commerce Commission, Oct. 18, 1905.

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of the Southern Railway said, " It is immaterial to the Southern Railway whether the cars furnished for the transportation of fruits, vegetables, and berries are owned by the Armour Car Line or not, so long as such company is able to furnish the required number of cars and they suit the shipper and conform to the rules of the Master Car Builders' Association." [1]

Although the railroads were at first apparently opposed to entering into exclusive contracts, their attitude changed on account of the failure of competition to render efficient service, as shown above. At present, there is hardly an important fruit-carrying railroad in the country which does not either own its own equipment, or allow some one private-car company to operate under an exclusive contract. The railroads not only find that the service is better to all parties concerned, but they also find it more economical. For instance, at the end of the season in 1895, the Central of Georgia had a large number of empty refrigerator cars left on its lines, owned by different companies, which it had to return to connecting roads, paying mileage in both directions. With only one company doing business, this difficulty, as well as extra switching service, *etc.*, is obviated. Armour surely has not power enough over the railroads, especially those that are situated in remote parts of the country, to force them unwillingly into these contracts, and therefore it is safe to say that, judging from the testimony and practices of the railroads, they favor the exclusive contract.

These arguments have been discussed at some length because exclusive contracts have been so bitterly attacked, and because they play such an important part

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[1] Testimony of L. Green before the Interstate Commerce Commission, Oct. 19, 1905.

in the problem. To summarize, the principal objections can all be traced to the fact that high icing charges are apparently due to the monopoly enjoyed under the contracts; and the principal arguments in favor of such contracts can be reduced to the fact that the existence of a single car line in a given territory results in the most efficient service to all parties concerned. What is the conclusion to be drawn: are exclusive contracts to be denounced because they make possible higher icing charges, or are they to be commended because they give the efficient service so necessary to the transportation of perishable products? Of course, if it could be proved that icing charges are uniformly reasonable, the main argument against the contracts would be swept away, and there would be left only the abstract argument as to the advisability of allowing monopoly in any form. As a matter of fact, to anticipate a little, the icing charges have not been proved uniformly reasonable, and in some cases, the consensus of opinion has been that they are quite the opposite. At any rate, the power to fix these charges has lain entirely in the hands of the car line, and not in those of the railroad, and the charge has been levied separately. It is in this arrangement that the source of the evil is to be sought, especially since the car lines have always denied to the Interstate Commerce Commission jurisdiction over the icing charges, on the ground that the refrigeration service is a local and private one, and not a part of interstate commerce. As will be shown at greater length in the last chapter, the Hepburn Act of 1906 made the service of refrigeration a part of transportation, and thus brought it under the purview of the Commission, as though it were a part of the railroad freight rate. This change in the law has practically removed the principal objectionable feature of exclusive contracts, even though the relief does not seem (in

1908) to have been immediate, and the car lines still determine the icing charge to be published by the railroad in its tariff.

The legality of these contracts has not been seriously questioned, and the attorneys of the Armour Car Lines have cited numerous cases as precedents to prove their lawfulness. After referring to the common-law liability of railroads to furnish suitable equipment, the Interstate Commerce Commission said in this connection:[1]

> The respondent railroad companies may provide refrigerator cars by purchase or by lease, and if the latter plan is adopted, they may make contracts with one company which exclude the use of cars owned by other companies.

If the railroads find it to their advantage to hire cars of only one company, there is no reason, either legal or economic, why they should not be allowed to do so. Now that the greatest abuse which has grown out of exclusive contracts has been made subject to regulation, there is good reason to believe that the condemnation of these contracts will cease to a great extent in the future.

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[1] Michigan Car Lines Case, *Int. Com. Rep.*, 1904, p. 300.

CHAPTER V

REFRIGERATION CHARGES

THE revenues of private stock-car and tank-car companies are derived mainly from one source—mileage rentals; while the revenues of refrigerator-car companies are generally derived from two sources—mileage rentals, which the railroads pay, and the charge for the refrigeration service, which shippers pay. The methods of determining and imposing this icing charge are very diverse. In the case of railroad ownership of refrigerator equipment, where the railroads do the icing themselves, there are, roughly speaking, four different ways of levying the charge: first, the most common practice is to charge according to the quantity of ice used, as for instance, $2.50 per ton, which is the usual rate east of the Missouri and north of the Ohio; second, the ice used in the initial icing is sometimes charged for, and that used for re-icing en route furnished free; third, some roads levy a fixed charge per car, irrespective of the amount of ice used; and fourth, some roads make no extra charge for icing, but expect to be reimbursed from the freight rate. This last method is often applied to the dairy business, which requires a comparatively small amount of ice.

In the case of private cars, many of the smaller companies have nothing to do with the icing, and the railroads over which they operate attend to this, and charge therefor, as if they owned the cars. The large packers own their equipment and generally do their own icing,

but when re-icing is done by the railroads at points where the car companies do not have icing stations, the railroad usually furnishes the ice on a tonnage basis. The custom of the large private companies which are in the fruit traffic is to charge a certain amount per car, or per package of freight. These lump charges have been the ones especially complained of as unreasonably high in many instances, and must be subjected to an impartial examination. The car companies decide what these icing charges shall be, and have generally had them published, when published at all, as separate and distinct from the freight rates of the railroad tariffs.[1] The railroads, however, have made the collections from their shippers, placing the freight and refrigeration charges on the same freight bill, and turning over the sums paid for icing to the car companies.

It must be remembered that this whole method of refrigeration in transit is of very recent origin. Even during the eighties there were but few refrigerator cars used in the carriage of fruit and vegetables, and it was not until after 1890 that the traffic began to attain any considerable size. Taking into account this fact, it may be said that icing charges have shown, on the whole, a rather rapid decline since the time when they were first imposed. Almost the only exceptions have been since 1900, when they were raised in some parts of the country under exclusive contracts. At first, icing charges were very high; it is said that in the year 1885 the California Fruit Transportation Company was accustomed to charge $200 or $225 for the use and icing of a car from Sacramento to Chicago. In 1890 the charge had been reduced

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[1] How this arrangement has been changed by the Hepburn Act of 1906 will be described in chap. viii.

to about $150 or $175.[1] During the nineties the rates continued to decrease, although not at such a rapid pace, and reductions were also effected by increasing the car-load minimum, making the same charge apply to more weight, as well as by changes in the car-load rate itself. The following table shows the reductions in icing charges per hundred pounds of freight made by the Continental Fruit Express on California oranges and lemons from 1892 to 1900, inclusive:[2]

Refrigeration Charges per 100 lbs. from California points to	Rate per 100 lbs.					Reduction in charges per 100 lbs. from 1892 to 1900.	
	1892 1893	1894	1895 1896 1897 1898	1899	1900		
	20,000 lbs. min.	24,000 lbs. min.	24,000 lbs. min.	24,000 lbs. min.	26,000 lbs. min.		
	Cents	Cents	Cents	Cents	Cents	Cents	Per cent
Denver	37.5	31.25	25.0	20.3	19.2	18.3	48.8
Omaha, St. Joseph, Kansas City	37.5	31.25	25.0	25.0	23.1	14.4	38.4
Chicago, St. Louis, Minneapolis	37.5	31.25	31.25	31.25	28.8	8.7	23.2
New York, Philadelphia, Washington	45.0	37.5	37.5	37.5	34.6	10.4	23.1
Boston, etc	45.0	37.5	37.5	39.6	36.5	8.5	18.9

It will be seen from the above table that the reductions in the icing charges from 1892 to 1900 varied from about 50 to less than 20 per cent, the larger reductions being for the shorter hauls. Up to 1895 there were two blanket rates, one applying to all territory west of and including Chicago, and the other to all territory east of Chicago. It is thus evident that distance and actual

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[1] I. C. C., Oct., 1904, *Hearings*, pp. 33-34.

[2] *Brief for Continental Fruit Express*, intervenor in Southern California Fruit Exchange *vs.* Southern Pacific Company *et al.*, tried before the Interstate Commerce Commission, March 30-31, 1900.

amount of ice used had but little to do with the determination of rates. In 1895 rates to Missouri River points and west thereof were lowered, making three groups, and in 1899 all points in the country were divided into eight groups,[1] distance thus entering more and more as an element in fixing the charge. In 1900, the charge for icing a car to Chicago was $75, the same that it was in 1892, but at the later date it applied to 26,000 pounds of fruit, while at the earlier date it had applied to only 20,000 pounds, a fact which accounts for the reduction shown in the table. Although it was testified before the Commission that the cost of icing the larger cars was a little greater, the difference was probably not great enough to increase materially the cost of the service. Accordingly, from the standpoint of the car company, this could scarcely be called a reduction,—at least, not a voluntary one.

The figures given above deal with but one car line, the Continental Fruit Express, which was acquired by the Armour interests about 1900. There has been other evidence before the Congressional committees that charges were higher during the nineties than those given in the table, and that there was a more considerable decrease after the Armour Company received an exclusive contract. At any rate, these figures illustrate the general trend of refrigeration charges, and afford an idea of the relation between these charges and the distances the cars travel. The Armour California tariff schedule for 1906 divided the country into practically the same eight groups that the Continental Fruit Express did in 1900, but made different rates according to the routing.

Although icing charges are much lower than they were at first, they have been subject to bitter complaints in

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[1] Three groups are omitted from the table.

Michigan, California, Georgia, and numerous other sections. Let us look at the Michigan situation first. Prior to 1900, the Pere Marquette and Michigan Central Railroads furnished refrigerator cars, and the railroad rate included the necessary icing. Beginning in that year, the railroads inaugurated the practice of charging, in addition to the railroad rate, $2.50 per ton for the actual amount of ice used. This arrangement lasted until 1902 when contracts were made with the Armour Car Lines, whereupon icing charges were raised all the way from 100 to 300 per cent. Since the icing was free previous to 1900, the cost of transportation to the shipper was increased by the full amount of the icing charge. Railroad rates were not only not reduced in consequence of the imposition of the higher icing charges, but in some instances they were even raised between the years 1900 and 1904.[1]

The extent to which icing charges were raised will be shown by the following. As they varied with the amount of ice used before 1902, the charges for that time are rough averages. From Michigan points to Duluth, Minn., the charge had varied from $5 to $15 per car, and in 1902 it was raised to $45. Other changes were these: Michigan points to Chicago, from $7.50 to $25 per car; Michigan points to Philadelphia, from $20 to $50; Michigan points to Boston, from $20 to $55; Michigan points to Pittsburgh, from $5 to $35. The numerous complaints of shippers finally culminated in an investigation by the Interstate Commerce Commission, undertaken upon its own motion and held in Chicago in June, 1904.

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[1] Brief of Martin S. Decker, attorney for the Government in the Michigan Fruit Case. *Cf.* also testimony of E. M. Ferguson, Elkins Com. *Hearings*, vol. i, p. 319.

In this hearing the terms of the exclusive contracts were made public, and the facts as to the increase of icing charges established. It was found by the Commission that the average cost of ice in Michigan was approximately $2.00 per ton, and that although it was somewhat greater in territory which the cars traversed in reaching their destinations, the average cost was somewhere between $2 and $2.50.[1] Expense bills were submitted, giving the number of tons of ice used on specific shipments, and showing that the arbitrary Armour charges were entirely disproportionate to the cost of ice.

In defence of these icing charges of the Armour Car Lines, Mr. Robbins, their president, advanced the following arguments: that the old railroad charges were for cars of small ice capacity, which were generally unfit for fruit traffic; that previous to the exclusive contract there had been a charge to the shippers ranging from $5 to $20 for the mere use of Armour cars, and that the railroad had either paid the car line for the ice that it provided, or itself furnished the ice; and that when the contract was made, whereby the car line furnished all the icing, the rates were merely advanced to cover the extra expense, causing no increase in the profits of the car company.[2] It was shown also that the conditions in Michigan were different from those in any other part of the country, because in no other instance had a railroad furnished free ice for fruit shipments, and consequently that the imposition of regular icing charges had appeared to be an unreasonable advance. It was maintained that the new rates were no more than enough to cover the cost

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[1] 11 *I. C. C. Rep.*, p. 132.

[2] Testimony of G. B. Robbins before House Com. on Int. Com., May 15, 1905. Also testimony of same witness in Elkins Com. *Hearings*, vol. iii, p. 2371. Also Mr. Armour's book, p. 253.

of ice, and the expenses of supervision and incidentals. Furthermore, the testimony of a number of prominent peach growers was offered to the effect that they were better satisfied to pay the higher charges in order to insure the well-nigh perfect service afforded, than to pay the lower charges, and have their fruit reach market in poor condition. Many of them said that their profits were higher per car in spite of the advanced icing charges, because of the better service.

The opinion of the Commission in this case has been quoted in connection with exclusive contracts, and it was seen there that the icing charges were declared unreasonable. This was expressed only as an opinion of the Commission, and no formal order was issued. In May, 1905, witnesses were again called. Then it was that the Michigan Central announced the discontinuance of the Armour contract and the return to the old rates on a tonnage basis, and that company was dismissed from the proceeding. Inasmuch as the Pere Marquette promised reductions for the season of 1905 and the discontinuance of the Armour contract in 1906, the Commission contented itself with a statement of its opinion that $2.50 per ton was an adequate charge for icing, because this left something over and above the actual cost of the ice to cover incidental expenses of supervision, *etc.*, and also drew up a schedule of rates per carload which it considered reasonable. We append a table showing the icing charges per car of peaches from Michigan to various points, as they existed at first under the exclusive contract, as they were after being reduced, and also the corresponding rates which the Commission declared to be reasonable.[1]

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[1] These figures are selected from the revised brief of Martin S. Decker on behalf of the Government, and from the report and opinion of the Commission in the Michigan Fruit Case, 11 *I. C. C. Rep.*, p. 129 *et seq.*

Michigan points to	*Icing charges in 1903 and 1904.*	*Icing charges as reduced in 1905.*	*Icing charges declared reasonable by I. C. C.*
Albany	$42.50	$35.00	$21.25
Baltimore	50.00	40.00	25.00
Boston	55.00	45.00	27.50
Denver	50.00	40.00	25.00
Duluth	45.00	35.00	22.50
New York	50.00	40.00	25.00
Philadelphia	50.00	40.00	25.00
Pittsburg	35.00	27.50	17.50

In its estimate of reasonable charges, the Commission allowed somewhat more than $2.50 per ton of ice actually used, and in that way made them, in its opinion, "amply sufficient to cover all necessary inspection and to allow the carrier a safe margin of insurance against whatever liability it assumes in undertaking the service of refrigeration." Taking everything into consideration, the opinion of the Commission seems to have been just. There is no question but that the service was greatly improved under the Armour contract; more costly equipment was furnished and the expenses of supervision were greater. Even though the shipper was better off than under the old régime, that is no reason why he should pay more than a reasonable amount for refrigeration. It must be remembered that over and above the earnings from refrigeration, the car line receives from the railroad three-quarters of a cent mileage for each car, loaded or empty, and on a round trip to Boston, for example, calling the distance 2000 miles, this means an additional revenue of fifteen dollars. The fact that the car line receives this compensation, as well as a payment which has often been twice the actual cost of the ice used, leads to the conviction that the much-discussed icing charges of the Armour Car Lines under exclusive contracts with the Pere Mar-

quette and Michigan Central Railroads were unfair and unreasonable.

The icing charges levied by Armour and Company appear extortionate in comparison with the charges of railroads which furnish refrigerator cars and do the icing themselves. This is shown in a striking way in connection with charges from southern and middle-southern states, where a comparison with Illinois Central Railroad charges is possible. The Louisville and Nashville Railroad formerly furnished refrigerator cars to fruit shippers, and charged $27 per car from Alabama and Mississippi points to Chicago. Armour was given an exclusive contract on this road and raised the price for icing to $60 and $75, causing an outcry from strawberry growers of those sections.[1] A Chicago firm received a shipment of tomatoes in an Armour car with a charge of $73.92 for icing; on the very same day it received a like car of tomatoes over the Illinois Central, on which the icing cost was only $15,—and Memphis is a few miles farther from Chicago than Gibson.[2] In order to bring about a test case, the National League of Commission Merchants instructed the consignee of the above cars to refuse to pay the Armour icing charge. The railroad accepted the payment of the freight rate, and sued for the refrigeration charge. The commission merchant lost in this case, for it was held by the court that the icing charges were known to the shipper before the shipment was made, and that the fact that the shipment was made constituted an agreement to conform to the established rate. A like refusal was made by another Chicago

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[1] I. C. C., Oct., 1904, *Hearings*, p. 205.

[2] *Report of the Refrigerator Car Lines Committee*, National League of Commission Merchants, 1905, p. 7.

firm to pay icing charges of $45 on a car of melons from Poseyville, Indiana, the freight rate in this case being only $39.15. In this instance the Armour Car Lines, instead of the railroad, sued for the payment, and the decision of the court was likewise against the fruit dealer. In both cases it is claimed that the railroads really performed the icing, and that it did not cost more than $15 a car.[1]

In 1903 a dealer in Cincinnati received 14 carloads of pineapples from Mobile, Alabama, with a charge of $45 a car for icing. At the same time he received ten carloads from New Orleans via the Illinois Central, on which the average charge was $11.37 a car, and the distance to Cincinnati from New Orleans is greater than from Mobile. The dealer refused to pay the Armour charges, and the Louisville and Nashville threatened to take away his credit and sue him. Finally, after a few months, the railroad said that if he would pay the full amount of the bill, it would refund all in excess of $11.37 a car, which the dealer had offered to pay, and this was done. At this same time, Armour and Company were themselves dealing in pineapples in Cincinnati, and selling in competition with the above dealer at an advantage of about $35 per car.[2]

These relative rates have never been investigated to any extent. Mr. Robbins sought to justify the high charges, but made a rather lame explanation, failing to advance any valid reasons.[3] The Illinois Central has an ample equipment of excellent refrigerator cars, and gives good

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[1] *Report of the Refrigerator Car Lines Committee*, National League of Commission Merchants, 1905, p. 6.

[2] I. C. C., Oct., 1904, *Hearings*, p. 106.

[3] Testimony before House Com. on Int. Com., Feb. 4, 1905.

service. One thing that can be said which partially explains the above disparity in rates, is that the Illinois Central does not fix its icing charge so as to cover the whole cost of the refrigeration service, but makes up for some of this extra expense from its freight rate.[1] Although a private-car company has to charge something over and above the actual cost of the ice in order to cover the expenses of the special service that it offers, it is not justified in allowing such a wide margin as is revealed in the above cases.

The history of icing charges in California up to the year 1900 has been dealt with in the first part of this chapter. Although the charges of that year showed a substantial reduction as compared with those of ten years before, complaints were filed with the Interstate Commerce Commission by the Consolidated Forwarding Company and the Southern California Fruit Exchange, and an investigation followed. The main questions at issue involved first, the reasonableness of the freight rate as fixed by the Santa Fe and Southern Pacific Railroads; second, the reasonableness of the refrigeration charges; third, whether the defendant railroads had unlawfully agreed to pool their traffic in citrus fruits or divide the earnings therefrom; and fourth, whether the regulation of the defendant carriers in reserving to themselves the right to route shipments over connecting roads was unreasonable under the Interstate Commerce Act. The Continental Fruit Express and the Armour Car Lines intervened on behalf of the defendants and furnished valuable information concerning the cost of icing.

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[1] This was told the writer by an official of the railroad in a personal interview.

During the hearings it was testified that at Los Angeles ice cost $4.50 per ton, at Sacramento $5.75, at points nearer the Rocky Mountains $3, and east of the mountains $2.50. Car line officials estimated the incidental expenses, including labor, inspection, *etc.*, at $15 a car per trip. With these figures as a basis, the Continental Fruit Express estimated that the total cost of refrigeration from Los Angeles to Chicago via the Ogden route was $59.50.[1] The largest item was the cost of five tons of ice at the initial icing. It was further shown that the season was comparatively short, that it ordinarily took sixty days for a car to make a round trip to the East, and that the cost was even greater over the Southern Pacific, or El Paso route, because that line runs through a warmer climate where more ice is needed. Officials of other car lines that had operated in California estimated their expenses per trip at from five to fifteen dollars less than the above figures, but their cars were of smaller ice capacity and their companies did not have the re-icing facilities that the Continental Fruit Express had. Taking these things into consideration, it was argued that the profits from refrigeration were not unreasonable, and that the rate of $75 to Chicago, for example, was fair.

On April 19, 1902, the Interstate Commerce Commission filed its report and decision,[2] but dwelt mainly on the other questions involved and stated that the evidence was unsatisfactory as the basis for a definite conclusion on the reasonableness or unreasonableness of icing charges, and reserved its opinion on that point for a subsequent hearing. The supervision of the Commission

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[1] Brief of attorneys for Continental Fruit Express, containing extracts from hearings.

[2] 9 *I. C. C. Rep.*, p. 182 *et seq.*

over icing charges was contested by the defendants on the ground that the service was local and incidental and not a part of interstate commerce, and this question further complicated the case. In April, 1903, a further investigation was held at Los Angeles.

During the interval between the two hearings, the Santa Fe, which had formerly used Armour cars under an exclusive contract, put into operation the equipment of the Santa Fe Refrigerator Despatch, and the icing charges both over the Santa Fe and the Harriman lines were reduced. The following table shows the icing charges from Southern California to eastern points as they were in 1900 and in 1903.[1]

SUMMER REFRIGERATION CHARGES

From California points to	*1900 per car*	*1903 per car*
Denver	$50.00	$50.00
Kansas City	60.00	60.00
Des Moines	70.00	62.50
Chicago, St. Louis	75.00	62.50
Indianapolis	80.00	67.50
Buffalo, Detroit, Cleveland	85.00	72.50
New York, Philadelphia	90.00	75.00
Boston	95.00	77.50

These reductions were declared by the Commission to be substantial. To quote from the report:[2]

> The actual cost of the ice delivered in the car tanks is stated in testimony to be $47.04 when the car is destined to the $50 group shown in the foregoing table; $54.32 for the $60 group; . . . and $64.53 for the $75 group. . . . The refrigeration charges now applied over either of the defendant lines

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[1] 10 *I. C. C. Rep.*, p. 609.

[2] *Ibid.*, pp. 610–611. This whole California matter is commonly called the "Orange Rate Cases;" the final opinion was not delivered until 1905.

upon this traffic are, in proportion to the distance the traffic is hauled, much lower than those imposed upon fruit traffic between points east of the Mississippi River where the cost of ice is much less than it is in California or in numerous localities west of the Missouri River upon the lines of the Southern Pacific and Sante Fe Systems. In view of the reductions in the refrigerating charges since the first hearing of these cases, and the insufficiency of the evidence as to cost of icing cars, we do not feel justified in condemning the present refrigerating charges as unreasonable.

The decision of the Commission was undoubtedly just. Taking into account the high cost of ice in California and the long haul to eastern points, with the consequent need of re-icing facilities, the California rates were very much lower than the Armour rates in Michigan and in the Missisippi Valley, and there has been no such striking divergence between the actual computable cost of ice and the charge imposed on the shipper. In the testimony offered before the Commission icing charges from California to New York were compared with those on strawberries from North Carolina to New York: [1]

	Distance.	*Rate per car per mile.*	*Rate per ton per mile.*
Los Angeles to New York..........	3403 miles.	2.64 cts.	.20 cts.
Wilmington, N. C., to New York......	643 miles.	10.26 cts.	.79 cts.

Although this comparative statement undoubtedly exaggerates the difference between California charges and Armour charges in the East, approximately the same results may be shown in other instances.

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[1] Brief of attorneys for Continental Fruit Express in Orange Rates Case.

The reduction in California icing charges appeased the fruit growers of that territory to a certain extent, but complaints were soon renewed. The Sacramento Chamber of Commerce in a report in 1903 upheld the charges as reasonable, while at the same time numerous growers were denouncing them. In 1906 the California Fruit Growers' Exchange passed resolutions declaring the charges "exorbitant." Nevertheless, as stated above, the charges seem to have been upon the whole reasonable, and the attacks against the car lines on this score have been unjust. Since these investigations, the Armour cars have been superseded by refrigerator equipment built and owned by the Harriman Lines, so that there are no longer any strictly private cars operating in California. In accordance with the recent law, the freight and icing rates are published by the railroads, but the total cost of transportation to the shipper remains about as it was.

One other interesting comparison that was brought out in the California hearings was that between the charges that have been under discussion and the icing charges on the Northern Pacific Railroad from Oregon and Washington points to the East. There, the practice has been to make a charge only for the initial icing, the railroad furnishing ice en route free of cost. Under this arrangement the whole icing charge varied from $10 to $17.50, and on prunes and some other fruits that were raised in both sections, the California growers were put to a great disadvantage in eastern markets. The Northern Pacific owns refrigerator cars, and absorbs part of the expense of icing in its freight rate, just as the Illinois Central does. It was pointed out by the defendants in the California case that the country traversed by the Northern Pacific is much colder than the Southern

Pacific territory, and that there was an abundance of natural ice. It was further stated that the traffic was small, and that the railroads of the northern section were granting low rates in order to foster the fruit industry along their lines, so that the conditions were not at all analogous.

As for icing charges in Georgia, it has been stated that previous to 1898 the rate to New York was $90 per car, and that under the exclusive contract it had been lowered first to $80, and later to $68.75. The Armour tariff on peaches for 1906[1] showed package rates of 11½ cents per crate to Richmond, Virginia, 12½ cents to New York, Philadelphia, Washington and St. Louis, 14 cents to Buffalo, Albany and Boston, and 15 cents to Minneapolis and St. Paul. The minimum car load was 550 crates, which, multiplied by 12½ cents, makes $68.75 per car to New York. These charges have not been the subject of serious complaint, although they have been attacked as exorbitant by some. Mr. J. H. Hale, reputed to have been the largest individual peach shipper in the United States, testified before the House Committee on Interstate Commerce[2] that on the whole icing charges were satisfactory. He said that during one season he had made a special arrangement with the Armour Company, whereby he paid $10 for the use of a car, and then paid for the actual amount of ice used on a tonnage basis. In this way he saved as much as $20 a car on some shipments, while on others his expense was higher than the regular rate, so that he did not save enough to make it worth while, and discontinued the arrangement.

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[1] *Refrigeration Tariff* of the Fruit Growers' Express, no. 726.

[2] Feb. 8, 1905.

It was testified before the Senate Committee that in 1898 ice had cost about $5 a ton in Macon, Georgia.[1] In 1899 the price of ice to the refrigerator line was reduced to $3 per ton, and it was rumored that in 1904 Armour was buying ice in Georgia for $2.50 per ton. On this basis it was declared that the icing charges in 1905 were exorbitant, inasmuch as ten tons of ice was a liberal estimate of the amount consumed in a trip to New York, and that counting in the expense of loading, the extreme cost to the car company could not have been more than $35 a car. If this estimate is correct, it is evident that the car line was receiving very generous compensation for supervision and incidentals, and was making a handsome profit therefrom. Even if the estimate should be a little higher, there would still be reason to suppose that the charge was large as compared with the actual expense.

Many complaints have been made among Georgia growers that the minimum of 550 crates is too high, because some of the smaller cars that Armour has furnished would not carry that amount safely, the upper tier of packages reaching market in poor condition. As a result of this, many growers have shipped less than 550 crates per car in order to avoid the necessity of loading five tiers high, but have had to pay icing charges on the established minimum.[2] This practice on the part of the car line was eminently unjust, but there has been a steady improvement in this direction through the placing of large cars in the service. The freight rate of the railroads on peaches has been the object of attack by shippers, and of consequent investigation by the Interstate Com-

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[1] Testimony of J. J. Waxelbaum, Elkins Com. *Hearings*, vol. i, p. 395.

[2] *Ibid.*, p. 394.

merce Commission which, in its report, held that the rate to New York was not unreasonable or unjust, but that an arbitrary charge of $80 per car exacted by the New York, New Haven, and Hartford Railroad between New York and Boston was unreasonable and unjust.[1]

To make a complete study of this question of icing charges, it would be necessary to examine them in still other parts of the country, but enough have been considered to enable us to draw some general conclusions. Of course the great difficulty in dealing with the subject is the lack of definite information. Estimates of the cost of the service have been given, but no definite figures have been advanced in the numerous Government hearings to show precisely what the profits of the private-car companies are from either icing or mileage. From the evidence at hand, however, it is safe to say that in some cases the icing charges of private-car lines are unreasonably high, thus placing an unfair burden on fruit growers and unduly augmenting the profits of the car lines, while in other cases these charges are fair and reasonable. The Interstate Commerce Commission said in its annual report for 1905 in this connection:[2] "extended investigations by the Commission have led to the conclusion that the charges imposed are, in some cases at least, exorbitant, and that those charges are not uniformly exacted." To solve the problem, therefore, some uniform method of levying the icing charge, so as to make it conform more directly to the actual cost of the service, should be adopted.

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[1] The Georgia Peach Growers' Association *vs.* Atlantic Coast Line. 10 *I. C. C. Rep.*, p. 255. This report gives a good description of the marketing of the Georgia peach crop.

[2] Page 7.

The agitators against private cars, however, have not been reasonable in their demands for a refrigeration rate which shall cover only the actual cost of the ice. They claim that the mileage received by car companies is sufficient to cover the other costs of the service. When these earnings from mileage are more than enough to cover interest on capital invested in the cars, repairs, and depreciation, there is some ground for this contention. Whatever these earnings are on beef cars and other refrigerator cars, it is extremely doubtful if they are sufficient in the fruit traffic to leave a surplus that can be used in defraying icing expenses to any extent. Fruit cars are idle a great deal of the time between shipping seasons, they have to be "parked" in the fruit region before active shipping commences, and the demand for them is uncertain owing to frequent crop failures. In view of these circumstances, it is perhaps fair to accept the statement of car-line officials that car-mileage in the fruit service is not sufficient to cover the incidental expenses of refrigeration.

There have never been given to the public any figures to show exactly what the expenses of refrigeration over and above the actual cost of the ice are. As already pointed out, they must include the cost of labor in handling the ice and loading the cars,[1] and the cost of supervision and inspection along the route. Icing platforms and storage houses have to be erected, and interest, depreciation, and taxes on various properties have to be considered.[2] The whole business is a fluctuating and

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[1] In some sections, as in Georgia, Armour men load the fruit into the cars, placing it in such a way as to secure the best ventilation and refrigeration.

[2] *Cf.* testimony of Urion, Elkins Com. *Hearings*, vol. iv, p. 3659.

hazardous one, and sometimes ice that has been stored previous to the fruit-shipping season has been wasted on account of crop failures. For instance, in 1889 the Armour lines shipped ice from Maine by steamer to Georgia, and stocked their newly-built storage houses, but on account of a late frost the crop was a failure, no cars were shipped, and the ice was a total loss.[1] Another item of expense to the car lines is in the payment of claims for damages due to inefficient refrigeration and lack of a sufficient number of cars. In their exclusive contracts Armour and Company relieve the railroads from liability to losses of this kind, and assume it themselves. It has been testified that in one year Armour settled claims of over $80,000 in North Carolina due to a shortage of cars, and the reason for this was said to be a congestion in freight yards, which prevented the arrival of the cars on time.[2] Furthermore, the whole system of refrigeration in transit is a "business in itself," as the President of the Santa Fe Refrigerator Despatch declares. Even where a railroad owns refrigerator equipment and has considerable fruit traffic, it has been found necessary to maintain a separate organization of inspectors in order to make the service efficient. One other point on the car line's side of the case is the fact that nearly 50 per cent of the traffic in refrigerator cars moves under ventilation,[3] without the use of ice, and the only revenue that the car lines obtain therefor is the mileage rental.[4]

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[1] Testimony of G. B. Robbins before House Committee, Feb. 4, 1905.

[2] A. R. Urion before the Interstate Commerce Commission, Oct. 18, 1905.

[3] Statement of W. B. Leeds, President of the Santa Fe Refrigerator Despatch, in a personal interview.

[4] The writer has been told by an official of one of the western railroads that Armour and Company try to collect an arbitrary sum, usually $15,

It seems rather strange that the car companies have not made more use of this fact when they have been trying to justify their position.

How, then, shall the icing charge be levied so as to cover these incidental expenses as well as the actual cost of the ice, and at the same time lead to no unreasonable profits for the car lines? The charge per car has its advantages, and not much objection can be made to it in some parts of the country, as in Georgia, where the short peach season comes in midsummer, and where a fairly uniform amount of ice is used on all shipments. In Michigan, however, peaches are shipped as late as October, and cool weather diminishes the shrinkage of ice. Armour and Company have met this condition by publishing what they call a "half-tank icing rate," much lower than the regular charge, to be used at the option of the shipper. On the whole, however, this arbitrary charge per car often does not show any just relation to actual cost of service, and frequently results in the shipper's having to pay much more than that service is worth. In one instance it was found that in a car, on which there was a charge of $67.20 for icing, there had been but 4,280 pounds of ice used.[1] The same objection may be urged against a per package rate or a rate per hundred pounds of freight. It seems as though the rate ought to be based in some way on the amount of ice used, for this constitutes by far the largest part of the cost of the service. This could be done by charging for

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from the railroads for the use of a car in winter when there is no icing charge, and that although some roads probably pay it, his company always throws the bills into the waste-basket. He further said that they had never been pressed for payment.

[1] *Report of the Refrigerator Car Lines Committee*, National League of Commission Merchants, 1906, p. 8.

ice on a tonnage basis, and by making an extra charge for the use of the car to cover incidental expenses. This method has been suggested by estimates that have been made by car-line officials as to the amount of these incidental expenses: in one case, the Continental Fruit Express reckoned it at $15 on a trip from California to Chicago;[1] in another, Armour and Company arranged with the largest individual shipper in Georgia to let him have cars for $10 a trip, and then charged him for the actual amount of the ice used.[2] This scheme would be in line with the general practice of the railroads of charging the bare cost of the ice; it ought to satisfy the agitators against private-car-line practices who clamor for a rate based on the amount of ice used, and it would provide for the incidental expenses of the car line for inspection and supervision.[3]

The question of refrigeration charges will probably give less trouble in the future than it has given in the past, because the icing service has been made a part of

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[1] *Cf. supra*, p. 128.

[2] *Cf. supra*, p. 124.

[3] Mr. E. M. Ferguson, Chairman of the Transportation Committee of the Western Fruit Jobbers' Association, and until recently president of that organization, advocates a fixed icing charge per car, or per hundredweight of freight, in preference to the per ton of ice basis. He argues that the latter method does not work satisfactorily; that it leaves open an avenue for fraudulent and careless weighing of ice, that it makes it impossible to know beforehand what the icing charge will be, and that it would be impossible to reach such a charge under the law. As intimated in the text, the lump-charge per car has many advantages, especially in sections where the amount of ice varies but little with different shipments, but it would seem that where the amount of ice does vary, a charge varying with the actual amount of ice used would be the ideal way. This is also the view of a great many fruit dealers, but Mr. Ferguson's views are entitled to consideration, as he is one of the best qualified men in the country to speak on the subject. *Cf. Report of Transportation Committee*, Western Fruit Jobbers' Association, Dec., 1907.

transportation by federal legislation, and the railroad is made responsible for it, just as for the carriage of freight. Through this change, shippers have recourse to the Interstate Commerce Commission to determine the reasonableness of the transportation rate, including the icing charge. This phase of the question will be dealt with in the last chapter.

CHAPTER VI

The Earnings of Private Cars

The earnings of private-car companies consist mainly of the mileage rentals received from the railroads, in some cases augmented by compensation for refrigeration service, and in a few cases by commissions on the freight rate. Of these three sources of revenue, commissions play an important part in comparatively few instances, icing charges are a source of profit only in the fruit and vegetable traffic, while the revenue from mileage rental is received by all private cars, and, in the majority of cases, is the only source of return. Computations of this income can be but approximate, owing to the scarcity of definite material. Although some companies have testified as to their earnings in government investigations, the more important lines have refused to do so, on the ground that they are not common carriers, and that strictly private companies should not be asked to divulge their earnings to the benefit of competitors. The Armour Car Lines have consistently avoided the imparting of any information whatsoever which could be used in a definite estimate of their earnings. Sometimes their representatives while on the stand have claimed ignorance as to mileage and earnings, and at other times they have merely refused to state them. The answers of Mr. Robbins, President of the Armour Lines, before the Senate Committee on Interstate Commerce are characteristic.[1]

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[1] Elkins Com. *Hearings*, vol. iii, p. 2409.

Question: Have you any way of estimating the mileage made by any one of your cars during an average year, as a basis for ascertaining the mileage earnings of the refrigerator cars per annum?

Answer: I have no figures on that subject.

Question: Does the company keep no figures that would indicate the earnings of those cars?

Answer: We have figures of our own earnings, but I wish to call your attention to the fact that we are a private-car line doing a private business, and our earnings for valid reasons, I think, ought not to be exposed to the public.

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Question: Have you any objections to stating the average mileage of those cars in the course of a year, according to your books?

Answer: I would rather not go into the question of earnings.

The Interstate Commerce Commission as early as 1889 referred to the earnings of private cars as very profitable. It cited the case of the cars of three shippers in Chicago, which traveled 7,426,406 miles in nine months, and earned $72,945.97 in mileage, or about the cost of 81 cars. The mileage was one cent per mile most of the time, and three-quarters of a cent the rest of the time. It stated that refrigerator cars run on fast time and make four times the mileage of ordinary freight cars, and that sometimes a car pays for itself in three years.[1] In 1891 the Commission had occasion to investigate the practices of the Lackawanna Live Stock Express, a stock-car line of 250 cars, and found that in two years this company had earned in mileage $205,582.68. The entire expense to be deducted for repairs and administration was $34,050.48, leaving a net revenue of $171,532.20, which was an excess of $15,032 above the whole cost of the cars. The company

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[1] *Int. Com. Rep.*, 1889, p. 15.

was therefore earning over 50 per cent on its investment, and the cars had paid for themselves in less than two years. This, however, was an extreme case, because extraordinary arrangements had been made with one particular railroad which handled the cars on such fast schedules that their daily mileage was much greater than that of ordinary stock cars.[1]

In 1891 Judge Schoonmaker, formerly a member of the Interstate Commerce Commission, read a paper before the third annual Convention of Railroad Commissioners, in which he discussed discriminations from the use of private cars. He said:

> The revenues of carriers are seriously impaired by the amount these mileage payments add to the expenses of operation, and it is not uncommon when rates are abnormally low, that, after deduction of these payments, not even the cost of carriage is left to the road, so that the traffic thus carried is sometimes detrimental to the carrier.

The convention appointed a committee to make a further study of the question and in its report for 1892 it submitted numerous figures to prove that the earnings were excessive. This committee estimated the number of private cars at the time as 70,000. At the average movement of railroad cars, 24 miles per day, these cars would have received $4,600,000 in mileage. But it went on to say that the movement of private cars was at least twice that of ordinary freight cars and in some cases four times as great, and that more than the regular three-quarters of a cent mileage was paid in some parts of the

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[1] Jacob Shamberg *vs.* Delaware, Lackawanna and Western Railroad, and the New York, Chicago and St. Louis Railroad, *Int. Com. Rep.*, 1891, p. 40. *Cf.* also 4 *I. C. C. Rep.*, p. 630 *et seq.*

country.[1] To make a rough calculation from these figures, we may estimate the average value of a car at $800, the daily mileage at three times the ordinary freight-car rate, or 75 miles, and the mileage charge uniformly at three-quarters of a cent. This perhaps overstates the mileage but understates correspondingly the mileage charges. These assumptions would give the following results:

Value of 70,000 cars	$56,000,000.
Annual mileage rental received	$13,800,000.
Percentage of mileage rental to total value	24.6 per cent.

The committee went on to recommend that only a reasonable mileage should be paid on loaded cars, and that no rental should be allowed on empty cars.

In its annual report for 1893,[2] the Commission, in speaking of the increasing use of private cars said:

> It is apparent that the use and method of payment constitute a serious burden upon commerce, and such payment now absorbs too large a portion of the earnings of carriers, and it is apprehended unless measurably abandoned or new methods of payment adopted, it may in the future to a still greater extent absorb earnings.

It was also stated that although the private cars then in use constituted only six and one-half per cent of the total car equipment, they made 20 per cent of the total car mileage of the country. In 1892 the Commission addressed to the railroads of the country a set of questions concerning the use of private cars. One question was,[3] "Is the payment of car mileage to shippers for

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[1] *Proceedings of the 4th National Convention of Railroad Commissioners*, 1892, p. 59.

[2] Page 60.

[3] *Int. Com. Rep.*, 1893, p. 65.

the use of private cars in your opinion a practice working injury to the railroads by forcing them to pay mileage on cars, while their own equipment suitable for the purpose stands idle?" Of 95 roads that answered, about one-third claimed that no injury resulted, and the other two-thirds asserted that such practice worked serious injury to the railroad companies.

In order to make an exact computation of the earnings of private cars, it is necessary to have the following data:

1. The mileage rental.
2. The average daily mileage of cars.
3. Cost of cars.
4. Expenses.

The most careful estimates that have been made on this subject are those of Mr. J. W. Midgley in the *Railway Age*, and that contained in the report of the Commissioner of Corporations on the beef industry. It is necessary to make separate estimates for the different kinds of special-equipment cars, on account of their different costs, mileage rentals, and average daily mileages. It is also necessary to distinguish between different classes of refrigerator cars because beef cars travel faster, and consequently earn more, than fruit, dairy, or beer cars. Discussion will be limited to the three principal kinds of private cars, refrigerator, stock, and tank, and these will be taken up in order, beginning with the first named.

REFRIGERATOR CARS

Mileage rental. It has been shown that the mileage rental on refrigerator cars east of Chicago and the Mississippi River is almost uniformly three-quarters of a cent, and that between Chicago and the Missouri River, and to a certain extent west of the Missouri, the prevail-

ing rate is one cent a mile, loaded or empty. It is impossible to determine just what proportion of the total mileage is subject to the three-quarters of a cent rate. The *Beef Trust Report* assumes that it applies to 85 per cent, inasmuch as the President of the Armour Car Lines had stated that the one-cent rate applied to about 10 or 15 per cent of the total mileage of beef cars. Others have estimated that the one-cent rate applies to a larger proportion. Assuming that the proportions are 85 per cent and 15 per cent, the average mileage rate of refrigerator cars would be .7875 cents.[1] Mr. Midgley places it at .8333 cents in his computations.[2]

Daily mileage of refrigerator cars. Mr. Midgley testified before the Interstate Commerce Commission that during 1901, the last year that mileage statistics were kept by the railroads, prior to the change to the *per diem* basis, the average mileage of dressed-beef cars on 23 leading railroads was 135 miles per day, and on all refrigerators of private ownership, 108 miles per day.[3] It appears, however, that these calculations did not take into account the fact that there should be deducted the time that a car is out of service. Dressed-beef cars are out of service not more than thirty days in a year, while fruit cars are out of service perhaps three months.[4] After taking this into account, the *Beef Industry Report* assumes that 90 to 100 miles a day would not be excessive for beef cars, and that sufficient allowance for the slow movement of empties and detention at terminals is

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[1] *Report of the Commissioner of Corporations on the Beef Industry*, p. 273.

[2] *Railway Age*, vol. 36, p. 677.

[3] I. C. C., Oct., 1904, *Hearings*, p. 8.

[4] Testimony of G. B. Robbins before House *Com. on Int. Com.*, Feb. 13, 1905.

made in this estimate. The reports of certain packing companies to various states showing their daily mileages, are of little value because they have generally applied only to a limited section. For instance, packers claimed daily mileages of from 350 to 430 miles for their refrigerator cars in the state of Michigan.[1] This is due, of course, to the fact that the traffic in that state is almost entirely through-traffic on fast schedules. There is almost no evidence to show that the average mileage of cars in the dressed-beef trade is below 100 miles a day, while there have been numerous statements which would seem to make it fair to place the figure higher. Mr. Midgley assumed in his articles that the average mileage of *all* refrigerators was 100 miles a day, but this is undoubtedly too high, because fruit cars have a much lower average, probably not more than 60 or 70 miles. The Santa Fe reckons that its fruit cars make about 66 miles a day throughout the year.[2] Dairy cars average about 65 to 75 miles a day.

It is evident from these various data that no exact computation can be made. By arbitrarily assuming mileage averages, however, which are obviously low enough according to the evidence at hand, certain interesting results may be brought out.

Cost of refrigerator cars. A first-class refrigerator car costs today about $1,100. The Santa Fe Refrigerator Despatch was paying $1,160 for cars in 1906.[3] In the same year the American Refrigerator Transit Company paid $1,100 apiece[4] for 1,000 cars. Armour and

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[1] *Beef Industry Report*, p. 276.

[2] Testimony of J. S. Leeds before Interstate Commerce Commission, Nov. 1, 1905.

[3] Information from personal interview with president of line.

[4] Elkins Com. *Hearings*, vol. iii, p. 2283.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Company claim that their fruit cars cost about $1,100.[1] During the nineties they cost sometimes less than $1,000. Materials were cheaper then, and 36-foot instead of 40-foot cars were generally built. For cars in the packing-house service, the *Beef Industry Report* assumes $1,000 as a fair average cost.

Expenses of refrigerator-car lines. The expenses may be classified as follows: first, repairs; second, operating expenses; third, taxes, insurance, *etc.;* and fourth, depreciation. No deduction for interest charges will be made in the following calculations.

Expenditures for repairs to refrigerator cars vary with different companies, some paying enough to include a part of the allowance for depreciation. Damages due to accidents are repaired by the railroads on which the accidents happen. The average cost for repairs would seem to be about $40 a year, and this is the allowance that the Bureau of Corporations adopts. Operating expenses amount to very little with most refrigerator-car companies, because only a small administrative service is necessary to supervise and record the movement of cars. In refrigeration for fruit traffic this item is much larger, as has been shown before. The *Beef Trust Report* allows $15 a car per year for operating expenses, and this would seem to be liberal.

Taxes are paid in a number of states, but their amount is insignificant in the aggregate. In 1905 Armour and Company paid taxes of $554.75 in Minnesota, and $1,321 in Iowa. Swift and Company paid $353.56 and $685 in these two states respectively. Eastern states have not developed systems of taxation on private cars to the extent that western states have. Taxes amount to so

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[1] Testimony of G. B. Robbins before House Committee, Feb. 13, 1905.

little, therefore, that they may be disregarded altogether. Insurance is even less important.

Depreciation, however, is an important element of expense. According to a rule of the Master Car Builders' Association depreciation on refrigerator cars is generally figured at six per cent.[1] Mr. Robbins testified that the Armour Car Lines charge off 12 per cent for depreciation,[2] but this is unnecessarily high. Mr. Midgley reckoned it at eight per cent, and this is probably fair, because refrigerator cars do not last as long as other cars. The Commissioner of Corporations uses six per cent, according to the Master Car Builders' rules.

The estimate of the receipts, expenses and profits of private refrigerator cars in the packing-house trade, as contained in the *Beef Industry Report*,[3] follows:

Assumed Cost of Car: $1000.	Average Daily Mileage.				
	50.	75.	90.	100.	125.
Average mileage rental	$0.007875	$0.007875	$0.007875	$0.007875	$0.007875
Average daily receipts	0.3937	0.5906	0.7087	0.7875	0.9843
Average yearly receipts	143.70	215.57	258.68	287.44	359.27
Expenses.					
Average yearly repairs	40.00	40.00	40.00	40.00	40.00
Average yearly operation expense	15.00	15.00	15.00	15.00	15.00
Average yearly depreciation	60.00	60.00	60.00	60.00	60.00
Total charges	$115.00	$115.00	$115.00	$115.00	$115.00
Balance, profit	28.70	100.57	143.68	172.44	244.27
Equals on investment, about	2.8%	10%	14.3%	17.25%	24.4%

From this table it will be seen that cars in the dressed-beef traffic earn about 14 per cent over and above expenses when the daily mileage is 90, 17.25 per cent at 100 miles a day, and 24.4 per cent at 125 miles a day.

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[1] *Beef Industry Report*, p. 280.

[2] Before House Committee, Feb. 13, 1905.

[3] Page 282.

Since 100 miles a day is a conservative estimate, it seems safe to say that the cars of the packers earn over 17 per cent on their cost from mileage alone. There is no profit from refrigeration in the meat traffic. The packers are both shippers and car owners, and they either furnish their own ice, or buy it of the railroads on a tonnage basis. Cost of ice should not be included among the expenses above, because the packers would have to buy ice just the same whether they used their own cars or not. A further proof that 17 per cent is a conservative estimate of earnings of dressed-beef cars is found in the statement of a certain packer to the Bureau of Corporations that the net profit from the operation of his cars had been about 20 per cent on the investment.[1] Also, the Cudahy Packing Company of Chicago furnished the Bureau with a statement of the operations of its car lines for 1902, 1903 and 1904. Figures selected from this statement are quoted, as they constitute perhaps the most definite statement of earnings that it is possible to obtain:

STATEMENT OF THE CUDAHY PACKING COMPANY.[2]

	Year Ending October 30.		
	1902.	1903.	1904.
Total mileage	31,719,547	29,646,971	31,230,366
Number of cars in service	815	822	845
Total mileage payments	$285,490.93	$274,444.24	$321,882.42
Gross operating expenses	115,656.34	121,973.89	145,879.00
Profits	$169,834.59	$152,470.35	$176,003.42
Per cent of profits on original investment	22%	20%	17.7%

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[1] *Beef Industry Report*, p. 283.

[2] *Ibid.* (These figures include 34 tank cars.)

From this statement it will be seen that the Cudahy Company received profits of 22 per cent, 20 per cent, and 17.7 per cent for the years 1902, 1903, and 1904 respectively. The cost of the cars was reckoned by the company at $940 each. A study of the gross operating expenses reveals the fact that between $140 and $150 per car was allowed, whereas the Bureau of Corporations estimated the annual expenses at only $115. As some of the equipment of the Cudahy Company was old, the Bureau concludes that its estimated expense "is apparently too high a figure to be used as a fair average for refrigerator cars generally." Estimating from the above figures, it will be seen that the average mileage earnings per car were about .9 cents, showing that the bulk of the traffic must have been west of Chicago where the one-cent rate applies. It may also be figured that the average daily run per car was 115 miles, so that on the whole the discrepancies between this statement and the estimate of the Bureau approximately offset each other and lead to the conclusion that the Bureau's estimate is a conservative one.

Mr. Midgley in his computations, "to be entirely safe and more than fair," allows a daily average of 135 miles for the cars of the principal packers. He then deducts 20 per cent from the total number of cars to allow for time out of service, and uses a year of 350 days. Reckoning depreciation at 10 per cent, repairs at $50 per car, and operating expenses at five per cent of the income, he finds that these cars earn about 21 per cent on a value of $800 per car. His allowance for time out of service is at least twice as large as necessary. Mr. Midgley also says that he has been informed that the dividends paid by one large packing company on the stock representing its refrigerator equipment had been

25 per cent per annum, by another company 22 per cent, and that the head of a third packing company had made the statement that of all its ramified interests no department yielded such profitable returns as its refrigerator-car line.[1] All this testimony taken together establishes pretty conclusively the fact that refrigerator cars used in the shipment of dressed beef and provisions earn from 17 to 20 per cent on their value.

Refrigerator cars in the fruit and vegetable traffic show no such large earnings from mileage as do beef cars. They are out of service a good deal of the time between shipping seasons, and do not run on such fast schedules. Their average mileage for the year is probably not over 65 or 70 a day, notwithstanding various estimates which have placed the figures much higher. It was testified before the Interstate Commerce Commission in 1900 that the old Goodell Refrigerator Line had earned in the California fruit traffic $111,000 in mileage in five years on 100 cars, which cost $1,054 apiece.[2] This would be $222 per car per year, which would indicate a daily average of about 80 miles. Deducting $115 a car for expenses, the profit was about 10 per cent of the cost. It was also claimed, however, that the cost of refrigeration was never more than $55 a trip, and that the icing charge had been about $90. If this was true, it is evident that it would have required only one or two trips a year under refrigeration to augment considerably the annual profit per car.

According to statistics procured by the Bureau of Corporations for the year 1904, the Continental Fruit Ex-

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[1] *Railway Age*, vol. 35, p. 89.

[2] Brief of attorneys for Continental Fruit Express in Orange Rate Cases.

press, an Armour corporation, had 1,645 cars, and the total mileage was 36,745,135,[1] which meant a daily average of 61.2 miles. At three-fourths of a cent a mile, the gross receipts per car were $167.53. Deducting $115 for expenses, the profit was $52.53 per car per year, which just about covered interest at five per cent. It is not worth while to attempt to estimate the profits from refrigeration, but it has been shown that in a great many cases where Armour operates under an exclusive contract these profits are unduly high, so that, taken together with receipts from mileage, they evidently constitute a very handsome return. The profits from refrigeration tend to make up for the slower movement of fruit cars and place them more nearly on the earning basis of meat cars.

In this connection the Santa Fe Refrigerator Despatch furnishes an instructive object lesson. This company leases its equipment from the Santa Fe railroad, paying five per cent on the value of the cars, and the railroad pays the subsidiary concern no mileage rental. When traveling on railroads other than the Santa Fe, these cars earn three-fourths of a cent mileage, and it has been testified that about 65 per cent of the total movement is over Santa Fe rails, leaving only 35 per cent that earns mileage.[2] The car line performs the icing and receives all charges levied for this service. It also pays for all repairs, expenses of operation, administration, *etc.* out of its earnings. Furthermore, it has been testified that the revenue of the company has been sufficient to meet all expenses. In other words, it has earned enough from

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[1] The Bureau of Corporations procured these figures from certain state reports, but intimates that their exactness is doubtful. *Cf. Beef Industry Report*, pp. 270 and 282.

[2] I. C. C., October, 1904, *Hearings*, p. 145 *et seq.*

refrigeration charges and from mileage on only 35 per cent of its operations to pay all expenses of refrigeration, maintenance and supervision, and also five per cent on the value of the cars. This suggests the probable earning capacity of fruit cars that receive a mileage rental on their total wheelage. Suppose that these Santa Fe cars received three-fourths of a cent mileage on the other 65 per cent of their movement. The average daily mileage has been stated as 66 per car. On January 1, 1906, the company owned a little over 6,000 cars. 65 per cent of this is 3,900 cars, which would earn in one year $704,632.50. Since all expenses of the company are met from what it actually receives, the above amount would be net profit. Calling the value of the equipment $6,000,000 this net profit would equal 11.7 per cent on the investment, or, if interest be not deducted, 16.7 per cent on the investment. Armour fruit cars earn mileage everywhere they travel. Profits from refrigeration are not so great in California business, which constitutes the bulk of the Santa Fe traffic, as in other sections under exclusive contracts. Although this reasoning is not offered as absolute proof, it seems to lead inevitably to the conclusion that the earnings of refrigerator cars in the fruit traffic from mileage rental and refrigeration service together equal at least 12 or 15 per cent on the investment.

Refrigerator cars in the dairy and beer traffic can not augment their profits from icing charges. For the dairy traffic many of the important railroads own sufficient equipment, and there are comparatively few private companies engaged in this business. As already stated, these companies often receive a commission on the freight rate. Sometimes this commission is allowed for the purpose of defraying the expense of icing when that service is undertaken by the car line, as in the case of Armour

[illegible]

cars in the dairy traffic, but a commission of 12½ per cent, which is the usual rate, ordinarily leaves a small surplus of profit above the cost of the ice. The railroads usually attend to the icing and charge it up to the car lines at $2.50 a ton in trunk-line territory. The initial icing is often charged to the shipper. Sometimes the railroad assumes the whole or a large part of the expense of refrigeration. The cars earn uniformly three-quarters of a cent mileage, loaded or empty.

The Dairy Refrigerator Despatch, above referred to, receives a commission of 12½ per cent from the Lackawanna, and the car company stands 12½ per cent of the cost of icing, the railroad paying the remainder.[1] The Missouri River Despatch, which receives 12½ per cent commission on the freight rate from the Erie pays for all ice used. The manager of this company testified before the Interstate Commerce Commission that on a trip from Chicago to New York, the 12½ per cent commission amounted to about $16, and the mileage to $15; also that one car made the round trip in about a month, and that the cars cost $910 each.[2] Allowing one month out for repairs and delays, and $12 per trip for cost of ice, (the estimate of the witness), these figures would mean a gross revenue of about $209 per car. Deduct $120 for repairs, depreciation, operating expenses, *etc.*, and the net revenue is $89 per year, or a fraction under 10 per cent of the cost. This estimate is very rough, but fairly conservative. The Chicago, New York, and Boston Refrigerator Company, operating about 700 cars, receives a commission of 12½ per cent from the Grand Trunk and Central Vermont Railroads, and 10 per cent

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[1] I. C. C., October, 1904, *Hearings*, p. 156.

[2] *Ibid.*, p. 94 *et seq.*

from the West Shore. It was testified by an officer of the company that the commissions just about cover the expenses of refrigeration, so that the earnings of the company are derived from mileage alone.[1] The companies above mentioned, although on intimate relations with certain railroads, are not owned by them. Neither are they identified with shippers. The earnings are not excessive, and there are no serious complaints against them.

Refrigerator cars operated by the brewers generally earn nothing but mileage, and revenue from this source is not usually excessive. Certain railroads pay commissions on the freight rate in order to attract traffic to their lines. One glaring instance of this has been the case of the Milwaukee Refrigerator Transit Company, which has been referred to above, and which will be discussed in the next chapter. Suffice it to say in this place that the earnings of this company were fairly large. Many brewing companies hire cars for their own use at a monthly rental. Armour and Company lease some of their older cars in this way for $17 or $18 a month.[2] As these cars are practically unfit for the fruit traffic, and as they have undoubtedly much more than paid for themselves during the years they have been in service, the profit to Armour and Company is unquestionably large. The fact that the breweries find it profitable to hire cars at these rates would seem to indicate that the earnings from mileage are sufficient to cover expenses, and that if they could afford to put sufficient capital into equipment, they could make a fair net profit.

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[1] I. C. C., October 1904, *Hearings*, p. 153 *et seq*.

[2] *Ibid.*, p. 56.

STOCK CARS

Stock cars earn uniformly six-tenths of a cent a mile, loaded or empty. Their daily mileage has been variously estimated. Figures furnished by four railroads in 1892 indicated an average of about 80 miles a day.[1] In 1904 Mr. Midgley placed it at 72½ a day.[2] He also said that west of the Mississippi they traveled much slower than in the East, and that their mileage was probably not more than 50 a day.[3] 60 miles a day is perhaps a fair estimate for the whole country. Stock cars are cheaper than refrigerator cars. The Interstate Commerce Commission stated in 1889 that they cost $650. In 1904 it was testified that the patent cars of one of the largest companies cost about $700.[4] Another witness said that they cost from $600 to $750.[5]

When the mileage rental was three-fourths of a cent, and before the livestock traffic to the Atlantic seaboard had given way to dressed-beef traffic, the earnings of these cars were very large. Since the reduction to six mills, however, the earnings have fallen off, and probably cover but a little more than a fair rate of interest on the investment. Mr. Midgley placed the gross earnings from mileage at $106.82 a year. After deductions for repairs, depreciation, *etc.*, only a small balance is left. The head of one of the oldest cattle-car companies said that the reduction to six mills had driven some companies out of business, and that he considered it hardly a fair compensation.[6] The general manager of Street's Western Stable

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[1] *Proceedings of the Annual Convention of Railroad Commissioners*, 1892, p. 60.

[2] I. C. C., October, 1904, *Hearings*. p. 8.

[3] *Railway Age*, vol. 36, p. 471.

[4] I. C. C., October, 1904, *Hearings*, p. 119.

[5] *Ibid.*, p. 111.

[6] Mr. Mather of the Mather Stock Car Company. I. C. C., October, 1904, *Hearings*, p. 113.

Car Line stated that his company was making but a trifle over five per cent interest on its capital.[1] On the whole, then, it is safe to say that private stock cars are not making excessive earnings, and this view is borne out by the Interstate Commerce Commission in its annual report for 1904:[2]

> We have never received any complaints from shippers of livestock in reference to the use of private stock cars, and we are inclined to think that there is not today any great injustice to the shipping public growing out of the use of these cars, nor do we think that the furnishing of such cars at the present rate is attended with undue profit to the companies which supply them.

TANK CARS

The rental paid by railroads for the use of tank cars is three-fourths of a cent a mile in all parts of the country. Mr. Midgley stated before the Interstate Commerce Commission in 1904 that they averaged about 66 miles per day.[3] In his articles in the *Railway Age*, he stated that during parts of the year 1902 they averaged only a little over 32 miles a day east of the Mississippi, but that in the West they had a daily mileage of about 95.[4] As the bulk of the traffic is in the East, these figures indicate a much lower daily mileage than the 66 miles a day re-reported to the Commission. From figures furnished to the Bureau of Corporations, the 34 tank cars of the Cudahy Packing Company averaged about 34½ miles a day for the year 1904.[5] The cost of oil cars was placed by the Commission in 1889 at $610. Since that time,

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[1] I. C. C., October, 1904, *Hearings*, p. 121.

[2] Page 13.

[3] I. C. C., October, 1904, *Hearings*, p. 8.

[4] Vol. 36, p. 470.

[5] *Beef Industry Report*, p. 283.

however, larger and stronger cars with steel under-frames have been built, and it was testified in 1894 that the best cars cost $900.

Although there are a number of companies which own a few tank cars, the Union Tank Line, a subsidiary concern of the Standard Oil Company, is by far the most important, and is, in fact, next to the Armour Car Lines, the largest private-car line in existence. During the agitation among railroad men in 1894 to reduce the mileage rental on oil-tank cars, the Union Tank Line claimed that:

> For the years 1891, 1892, 1893, the company earned upon its investment an average of 5.15 per cent without charging off anything for depreciation. Had the usual depreciation charge of six per cent been made, the Tank Line Company would have received no net return on all its investment. If the mileage is reduced to one-half cent per mile, it will deprive the Tank Line Company of 33⅓ per cent of its gross revenue, which would compel the company to maintain its equipment at an absolute loss and be a partial confiscation of a large property which has been created with at least the acquiescence of the carriers.[1]

In one of his articles, Mr. Midgley directly attacked the foregoing statement as incorrect. Without going into detail, especially as the figures he used in his computations were more or less arbitrarily assumed, he showed that the income of the tank line, as announced by its officials, would mean a daily average of only a little over 24 miles a day. He then said:

> That is a showing so absurd as to have been incredible. Tank cars never did make such an insignificant record; in-

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[1] *Railway Age*, vol. 34, p. 402.

deed, we know positively that the daily average mileage on a number of representative railroads in different sections of the country for the year 1901 exceeded 66 miles per day.[1]

Mr. Midgley's estimate of the gross earnings of tank cars, on the basis of 66 miles per day, but making a liberal allowance for time out of service, is $121.58 per year.[2] After charges for repairs, depreciation, operating expenses, *etc.*, are deducted, this evidently leaves but a small profit. It is a significant fact that Mr. Midgley's allowance for time out of service would reduce the average daily mileage for the year from 66 to 43.7. This is probably a fair estimate, although it is an open question whether they travel more than, or even as much as 40 miles a day throughout the year.

The vice-president of the Union Tank Line testified to the Interstate Commerce Commission that in 1903 his company had operated at a loss of 3.8 per cent of the money invested, and that during the first six months of 1904 it had operated at a loss of 1.7 per cent on an investment of almost $8,000,000. Furthermore, he asserted that nothing had been charged off for depreciation.[3] Since the company at that time had 8,140 cars in service, it is reasonable to question whether the capitalization was not placed too high. Nevertheless, if depreciation at six per cent had been allowed, earnings would have shown a loss even if computed on a much smaller capitalization. At an average of 40 miles a day, a tank car would earn $109.50 a year. Deducting allowances for repairs at $25 per car, depreciation at six per cent, or $48 per car, there would be left a balance of $26.50, or about 3⅓

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[1] *Railway Age*, vol. 34, p. 402.

[2] *Ibid.*, vol. 35, p. 89.

[3] I. C. C., October, 1904, *Hearings*, p. 221.

per cent on an assumed value of $800 a car. Even if the daily mileage were greater, no large earnings would be shown, and there is good reason to believe that the contention of the car line that its business is not profitable is sound.

Conclusions as to earnings. Private cars may be divided into two general classes according to ownership: first, those that are owned by shippers, and second, those that are owned by companies who are not also shippers. In the first class fall practically all refrigerator cars used in the dressed-beef traffic, and all tank cars; in the second class fall refrigerator cars used in the fruit traffic and almost all stock cars. It is evident that if the earnings are excessive for cars in the first class, those shippers owning cars receive a tremendous advantage over their competitors who do not own cars.

It has been shown that in the case of stock cars and tank cars the earnings are not excessive at present, whatever they may have been fifteen years ago. In the case of refrigerator cars, however, profits are unjustly high. This is especially true of dressed-beef cars, and in this case, the owners are also the shippers. The ethical and economic aspects of this arrangement will not be discussed in this place. It is sufficient to say that although the economies thus attained by the packers may have a slightly beneficial effect on the price of meat (at least theoretically), yet the payment of excessive mileage constitutes a serious burden on the railroads—a burden from which they should be freed. The Bureau of Corporations, in its *Report on the Beef Industry* in 1905 said:

> Whether such a rate of profit in ordinary business can be considered unreasonable is open to debate; but there can be little room for discussion when this profit is derived wholly

from a payment allowed by the common carriers of the country.[1]

The large trunk lines could easily afford to build their own equipment, and would find a great saving in doing so. They are powerless to attempt it, however, because all the packers have their own equipment, and no railroad could get any meat traffic if it refused to handle the packers' cars. The only avenue of escape would seem to be through a reduction of the mileage rental, and yet, judging from past experience, it is doubtful whether the railroads could bring this about. In this particular class of traffic, however, the rates on dressed-beef are so low, and the mileage payments are so heavy, that Mr. Midgley considers the carriage of these products as unremunerative to the railroads, and thinks that they could well afford to make a stand against the packers, even if it resulted in a temporary loss of traffic. It seems as though they might refuse to pay mileage on the return of empty cars, but even this would require the coöperation of all the railroads, and it is doubtful if it could be effected. The whole business offers a glaring, and almost an absurd, example of the power exercised by the large packers over the railroads.

Private refrigerator cars in the fruit traffic fall in the second class of private cars and are at present owned to a very slight extent by fruit shippers. The Continental Fruit Express, before its absorption by the Armour Company, was owned by the Earle Fruit Company, which was an extensive dealer in California fruits, and the complaints of other fruit men against the advantage that this company had were very bitter. Until 1904, Armour and Company dealt to a certain extent in fruit

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[1] Page 285.

and produce, but owing to the agitation against private cars at that time, they decided to discontinue the practice. The operation of private fruit cars is not so burdensome on the railroads, because they are able to maintain high freight rates on fruit, but they do place a burden on the growers. For instance, it has been said that dressed beef was originally classified with green fruits, but that the rates on meat have been continually hammered down so that they are much lower than the fruit rates. A statement on the relative fruit and dressed-beef rates from various points to Duluth, Minn., submitted to the Senate Committee in 1905,[1] shows that the rate on fruit per hundred pounds is from 28 to 54 per cent higher than the rate on beef. Likewise, the average rate on twelve different commodities from California to eastern points, including canned goods, wheat, wines, iron ore, vegetables, sugar and others, has been stated as 77½ cents per hundredweight, while the rate on fruit is $1.25.[2] Although it is reasonable for the railroads to charge a higher rate for this most perishable of all commodities, yet the absorption of large earnings by private companies undoubtedly tends to maintain the fruit rate at a disproportionately high level, thus placing a burden on fruit growers, and adversely affecting the prices to consumers.

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[1] Elkins Com. *Hearings*, vol. i, p. 369.

[2] Brief of J. H. Call, attorney for the Interstate Commerce Commission in the Consolidated Forwarding Company *vs.* Southern Pacific Company *et al.*

CHAPTER VII

Discriminations and Rebates

One of the principal charges against private cars is that they are used as a means of granting discriminatory rates and rebates. During the nineties this was perhaps the complaint most commonly heard, and it repeatedly received the attention of the Interstate Commerce Commission. It is easy to understand how privately owned cars, particularly when owned by shippers, may be used as a device to cover up discriminations and hide them from the eye of the public. During the attempts to put a stop to discriminations under the law, and especially before the passage of the Elkins Act, it was only natural that private cars should be looked on with suspicion. And, undoubtedly, this suspicion was not ill-founded, because, although many accusations based only on rumor and imagination were made, some reprehensible practices were discovered, and others have been confessed to since their cessation.

In the Lackawanna Livestock Express case, cited above,[1] a railroad made such extraordinary arrangements with a stock-car line, the owners of which were also shippers of cattle, that the mileage earnings were sufficient to pay for the cars in two years. In considering this case, the Commission held that the above practice constituted an unjust discrimination against all other

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[1] *Cf. supra*, p. 137.

shippers, and said further, that when such arrangements for the use of the cars of private shippers result in undue and exclusive advantages to certain parties, "it is a matter affecting the public interest, and undoubtedly comes within the purview of the law forbidding unjust discriminations and undue preferences."[1] The Commission also said: "It is believed that there are other methods by which the use of private cars may be, and has been, made the means of conferring undue advantage on certain shippers." One more quotation from the report of 1891 further illustrates the opinion of the Commission that the payment of excessive mileage constitutes a discrimination—an opinion that has been reiterated time and again since that year:

> Turning to the question of compensation made by the carriers to the shipper for the use of the latter's car, it is plain that if this compensation is more than a fair return on the cost of the car, treating that as an investment made by the shipper, this practically amounts to paying the latter a bonus for his business, a plain and flagrant discrimination against other shippers.[2]

In the oil cases that the Interstate Commerce Commission investigated about 1890, it was found that the rate on oil in tank cars was lower than the rate on oil in barrels, inasmuch as the tank was considered a part of the car, its weight not being charged for, whereas barrels were considered as packages for carrying oil, with their weight included in the freight rate. It was urged that it was cheaper for the railroad to handle oil in tanks, and also that any shipper was at liberty to provide tanks and thus derive the same advantages. The Commission-

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[1] *Int. Com. Rep.*, 1891, p. 40.

[2] *Ibid.*, p. 39.

ers held, however, that it was properly the business of the railroad to supply its patrons with suitable vehicles for transportation, and to offer the use of them to everybody impartially, and that failure on the part of the railroad to do this should not result in a discrimination against those patrons who were obliged to depend on the facilities provided by the road. The Commission accordingly held that the carriers' practice of charging for the weight of the barrels, in case of oil shipments in carriers' cars, while not charging for the weight of the tank in which the oil is transported in shippers' cars is unjust discrimination, and caused the rate on oil in tanks to be raised, and on that in barrels to be reduced. The Commission appreciated the nice economic question involved, and added that any other criterion of right conduct where the tank and truck both belong to the private shipper, "is manifestly founded on technical considerations, and not on substantial justice."[1]

The idea that the payment of excessive mileage constitutes a discrimination in favor of the shipper owning cars was also proclaimed by Judge Schoonmaker before the Annual Convention of Railroad Commissioners in 1891. He said, in part:

> In the case of shippers' cars there is no reciprocity. The money is paid directly to the shipper, and to the extent that it exceeds current interest on the cost of the car and a fair allowance for depreciation, it is a direct loss to the carrier and a discrimination in favor of the shipper.

Mr. Midgley also holds that it is a discrimination, and claims that the payment of mileage on empty cars is preposterous, and that it can be construed in no other way

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[1] *Int. Com. Rep.*, 1891, pp. 36–38.

than a concession to shippers for their traffic—an abuse which clearly comes under the Elkins Law of 1903.[1]

It has been claimed that other forms of discrimination have resulted from the use of shippers' cars. For instance, it was testified before the Industrial Commission that shippers often load their cars with merchandise of various classifications, and that after being sealed they are usually subjected to the tariff rate applicable only to the lowest class of freight contained in the car.[2] The Interstate Commerce Commission in its investigation of 1904 was unable, through questions to sundry witnesses, to unearth any such manipulations of rates, although they have undoubtedly been practiced to a certain extent. It has also been alleged that since the relations of the railroads with the private companies have always been strictly private, it has been easily possible to manipulate the mileage figures in such a way as to effect the payment of a rebate. These devices are possible ways of evading the law, but, although they have probably been used in times past, it is doubtful if they have persisted in the face of the more radical legislation and its more vigorous enforcement of the past five years.

What has been said above refers almost exclusively to the practices of owners of cars who are also shippers. In the case of private cars whose owners are not also shippers, such as the fruit refrigerator cars, and livestock cars, rebates and discriminations have until recently been very much in evidence. Stock-car companies have often paid rebates from their mileage earnings in order to induce shippers to use their cars. Mr. Midgley has stated that he has known of cases where

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[1] *Railway Age*, vol. 36, p. 44.

[2] *Report of the Industrial Commission*, vol. iv, p. 364.

this was done, and that in one instance a certain line turned over half of its earnings, which were very large, to the shipper who was a packer.[1] During the Interstate Commerce Commission's investigation in 1904, the question was asked of a representative of the Street's Western Stable Car Line, whether his company was in the habit of paying back anything to shippers. On advice of counsel, witness refused to answer[2] on the ground that his company was not a common carrier and was beyond the jurisdiction of the Commission. The Commission appealed to the court for an order to compel the witness to answer. Judge Landis handed down the decision on January 27, 1906. The Court assumed that if the answer had been given at the hearing, it would have revealed the payment of money by the Street's Company to shippers, and held that in such a case the private-car company was within the provisions of the Elkins Act, and that the payment of such money would have constituted a rebate, inasmuch as the statute is supposed to apply to the net cost of transportation to the shipper.[3] This interesting case will be referred to again.

During the nineties, refrigerator-car lines in the fruit traffic were frequently guilty of paying rebates to fruit shippers. In the era of competition before the adoption of exclusive contracts, such rebates were paid in Georgia, and especially in California, where they caused much demoralization. The facts in connection with these California rebates were brought to light in the Interstate Commerce Commission hearings in 1900, and it was claimed by car-line officials that the policy of the car line in refusing to grant any more rebates after January

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[1] I. C. C., October, 1904, *Hearings*, p. 11.

[2] *ibid.*, p. 116.

[3] 145 *Fed. Rep.*, 235.

first, 1900, had been the inducement which led to the institution of proceedings by the complainants who now had to pay the full rate and icing charge. At all events, complainants testified that until 1900 they had been receiving rebates regularly, and confessed that the return to the full charge had precipitated their complaint.[1]

The advent of exclusive contracts was really the direct cause of the amelioration of conditions in this respect, and it is safe to say that rebates are not now paid in the fruit traffic. In 1904 it was found that Armour and Company and the Santa Fe were not adhering accurately to their published refrigeration charges for California deciduous fruits, and that they were refunding $25 on each car shipped to Chicago, and $35 per car to points east of Chicago. This was explained by Mr. Robbins of the Armour Line by saying that this allowance was made on certain cars that shippers did not wish to have iced until they had crossed the mountains on their way east, and that all shippers were treated alike in this respect.[2] It is interesting to note that provision was made for this arrangement in the published Armour tariff for the following year. The practice seems to be legitimate, at least as it exists at present, and there are no longer any complaints.

One other possible source of illegitimate practice is to be found in commissions on the freight rate, paid by railroads to private-car companies. The contracts by which such lines as the Missouri River Despatch and New York Despatch receive such commissions on poultry and dairy products, over and above the mileage payment,

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[1] Brief of attorney for Continental Fruit Express in Southern California Fruit Exchange *vs*. Southern Pacific *et al.*

[2] Elkins Com. *Hearings*, vol. iii, p. 2368.

have been described. Clearly, if these companies are also financially interested in the products transported in their cars, this payment would be in the nature of a rebate. Or, if they turned over any part of their earnings as inducements to raisers of dairy products, this would obviously be a rebate. Officials of the New York Despatch, which has a contract with the Grand Trunk, testified that at one time they did make payments to shippers, and that the money for so doing had been provided by the railroad. They claimed, however, that they had ceased doing this, because the Grand Trunk had refused to permit the practice to continue.[1] Investigations have succeeded in disclosing no cases where these commission-receiving dairy lines have been owners of the commodities shipped,[2] and there seems to be no objection to their being paid commissions, especially as these funds are used to some extent to defray the cost of icing. One very interesting case in this connection, however, deserves a few words.

The Milwaukee Refrigerator Transit Company is a private-car line operating about 540 cars and engaged principally in the carriage of beer. During the private-car investigation in 1904, the Interstate Commerce Commission brought to light the following facts: that the car line was a Wisconsin corporation, the stock of which was owned by the Pabst Brewing Company people of Milwaukee; that the car company furnished cars to the brewing company for the transportation of its products; and that the car company had contracts with various

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[1] I. C. C., October, 1904, *Hearings*, p. 155.

[2] An exception to this is where Armour and Company deal in poultry and dairy products and receive commissions of 12½ per cent, but the car line performs all the icing and probably makes very little, if any, profit from the transaction.

railroads which provided not only for the payment of the regular mileage rental, but also for the granting of a commission of 12½ per cent in some cases, and of 10 per cent in others, on the net amount received by the railroad companies as freight charges.[1]

In 1905 a petition under the Elkins Act was filed in the circuit court for the eastern district of Wisconsin against the Milwaukee Refrigerator Transit Company, the Pabst Brewing Company, and several railroads, alleging that the payment of commissions by the carriers constituted a rebate. The subsequent hearings brought out many interesting facts. It seems that the Schlitz Brewing Company had operated a car line in much the same way at one time, and had received commissions from the railroads, but that this arrangement had ceased at the time of the passage of the Elkins Act. The manager of another refrigerator-car line in Wisconsin had consulted Attorney-General Moody as to the legality of these commissions with a view of procuring them for his own line. Attorneys for the Transit Company admitted the receipt of commissions, but claimed that no part of the earnings of the company had ever been turned over to the Pabst Brewing Company, and denied that the company had been organized, (as alleged), as a device, or otherwise for the purpose of enabling the Pabst Brewing Company to receive or accept any rebate, concession or discrimination forbidden by the acts of Congress. Attorneys for the railroads also claimed that they did not consider the payment of this commission an infraction of the law. The court decided, however, that although the particular practice above disclosed is not described in the Elkins Law, it comes within the inhibi-

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[1] I. C. C., October, 1904, *Hearings*, p. 40 *et seq.*

tion of "any device whatever," and therefore is a rebate condemned by law.[1] It is fortunate that the court was able to make the finding that it did, and that the Elkins Act had been so worded as to cover this sort of device. Otherwise an avenue of escape from the jurisdiction of the law would have been opened, and the practice might have developed into a far-reaching and serious evil.

The investigations of the Bureau of Corporations into the transportation of petroleum in 1906 unearthed discriminatory practices in connection with the use of tank cars of the Standard Oil Company. Although, as has been stated, the tank cars of the Union Tank Line receive three-quarters of a cent mileage, loaded or empty, the cars of independent refiners in California receive but six-tenths of a cent on loaded cars only, except where the haul exceeds 800 miles, in which case three-quarters of a cent is allowed on the excess mileage, but again on the loaded car only. It was also found that the Standard Oil Company had withdrawn 300 cars that it had leased to the Southern Pacific Railroad, and that by refusing to furnish cars to California oil refiners, it had hampered the industry in that state, caused a fall in prices, and then stepped in itself and bought up crude oil at the reduced prices.[2] This is a good illustration of the possibilities under private ownership.

On the whole, it is safe to sav that the actual payment of rebates in connection with private-car operations has practically ceased, and that the two most important influences in bringing this about have been the exclusive

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[1] *Cf.* 142 *Fed. Rep.*, 247; 145 *Fed. Rep.*, 1007; *Int. Com. Rep.*, 1906, p. 47; also *Milwaukee Sentinel* for Nov. 13 and Dec. 7, 1905 and for Jan. 30 and Feb. 1, 1906.

[2] Report of the Commissioner of Corporations on the Transportation of Petroleum, *Sen. Doc.*, no. 428, 59th Cong., 1st sess., p. 45 *et seq.*

contract and the Elkins Act. Some forms of discrimination still persist, however. The excessive mileage earnings of shippers' cars, especially in the dressed-meat traffic, are generally denounced on all sides as a discrimination in favor of the large shippers. Under the present organzation of industry on a large scale, it may be claimed that the resulting economies are justifiable, and that they are a part of the more efficient methods of production. Logical as this economic argument may be in many instances, there is one important consideration which vitiates its application to the case in hand. That consideration is the fact that the advantages received from large earnings are derived not from any inherent superiority of economic organization, but from a power over the common carriers of the country, a power resulting from the competition of railroads. The advantages redound to private corporations, and result in losses to the *quasi*-public business of transportation. The theory that competition among railroads is the remedy for all transportation evils has long been discarded, and legislation has been enacted for curing the abuses resulting from such a régime. Whether this practice can be attacked under the head of discriminations, however, is open to question. Although theoretically it would seem that the railroads could make a stand and rid themselves of the burden imposed by the car lines, experience has shown that so far they have not been able to do so. It would seem, therefore, that the government should interpose and free the railroads from this result of their competition, just as it has largely put a stop to rate wars, rebates, *etc.* The true source of relief would seem to lie in this direction.

CHAPTER VIII

Proposed Remedies and Present Tendencies

During this recital of the practices and operations of private cars we have attempted to suggest certain remedies for some of the evils that still exist. These remedies, such as the reconstruction of icing charges on a tonnage basis, and the lowering of the mileage rental for certain classes of cars, are the simplest and least radical of the many proposed methods of dealing with the problem, and are therefore the most likely to be adopted. It is not our purpose, however, distinctly to advocate any particular method of procedure, but rather to outline methods that have been proposed, and to subject them to a critical examination. Without going further into the possibilities of altering the amount of the mileage rental, in case that system should continue—as it undoubtedly will—we shall take up the more radical propositions advanced for the solution of the problem. The four most deserving attention are: first, to abolish private cars altogether, and to require the railroads to furnish their own special equipment; second, to form an equipment company or holding company to take over the private cars to be owned jointly by the railroads; third, to permit the continuance of private ownership, but to require the placing of the cars on a *per diem* basis of rental payment, instead of the mileage basis now in vogue; and fourth, to amend the Interstate Commerce Act so as to make it apply to private companies,

and thus bring their relations with the railroads under public control.

It has been a common impression that the leaders of the fight against private cars advocate their entire abolition. This, however, is scarcely true, for the most careful students of the problem seek merely a cure for the evils, mainly through Federal legislation. Mr. J. C. Scales, Chairman of the Refrigerator Car-Lines Committee of the National League of Commission Merchants, said specifically in his annual report for 1906, that the committee did not aim to drive private-car lines out of business, and that they thought it would be unconstitutional to attempt to do so. There is a strong popular opinion, however, that they should be abolished, and even a few of the active leaders in the opposition favor this. One of the most important witnesses before the Senate Committee on Interstate Commerce said: "I want to go on record in saying that in my judgment the only way to successfully legislate against these private-car-line practices is to eliminate the private freight car."[1] At another time the same witness said: "The proper course, in my judgment, and of those that I represent, is to eliminate, root and branch, all these barnacles from our common highways."[2] Many other quotations might be given from various sources to show that it is a very common feeling that this should be done. In fact, there was a bill introduced into Congress in 1906 to make it unlawful for any common carrier engaged in interstate commerce to use on its line any car not owned by it or by some other common carrier.

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[1] Testimony of E. M. Ferguson, President of the Western Fruit Jobbers' Association, Elkins Com. *Hearings*, vol. iv, p. 3682.

[2] *Ibid.*, vol. i, p. 313.

It is perhaps unnecessary to devote any considerable space to proving that this radical method of dealing with private cars is contrary both to the spirit of our laws and institutions, and also to the principles of economics. As has been frequently pointed out, the origin of private cars was due in large part to the refusal of the railroads to furnish the necessary equipment for handling perishable products when they were becoming an important part of the traffic. The railroads were opposed to the shipment of dressed meats, and also to the use of refrigerator cars, because they owned stock cars, and had a remunerative business in the livestock traffic, which they did not wish to see destroyed. It was a rather hazardous experiment for the first packers in the field to build their own cars, and they only did so after attempting to induce the railroads to furnish equipment. Even since railroads have begun to furnish special-equipment cars, private companies have always taken the lead in perfecting devices for the efficient carriage of highly perishable products, as they have gradually come on the market. In view of the fact that these companies have built up systems of the most improved cars, and have sunk large amounts of capital in them, it seems hardly fair to legislate them out of existence. Moreover, if it were entirely in the hands of the railroads to furnish equipment, it is almost certain that they would not provide cars in sufficient variety of design, and in sufficient numbers to give adequate facilities for the carriage of special commodities. To be sure, gross abuses have grown out of the system of private ownership, and the earnings of the cars have been so great that it has been profitable for companies who are not shippers to build and operate cars. The fact that they have been able to do so, however, is only further proof that the railroads

have not kept abreast of the times by furnishing cars especially adapted to certain kinds of traffic—cars for which there has been a growing demand.

It is not to be presumed, however, that the railroads ought to have furnished this special equipment, and that they could afford to do so now. Quite the contrary is in fact the case. The casual observer will say that the railroads can afford to own special equipment, and will point to the Illinois Central, the Santa Fe, and the Southern Pacific as concrete examples. The case of these railroads, however, is entirely different from that of the majority of the railroads of the country. These three have a year-round business in perishable products; the Santa Fe and the Southern Pacific haul citrus fruits from California during the winter months, and deciduous fruits during the summer. Even with this advantage, the Santa Fe has a number of its cars idle part of the year and seeks to run them on other railroads where they are needed. The Illinois Central runs solid trains of refrigerator cars throughout the year for the carriage of bananas from New Orleans to northern markets, to say nothing of the rich fruit and vegetable crops of the whole Mississippi valley, which ripen at different seasons of the year. This road has sufficient perishable traffic to keep its equipment employed on its own lines, and it is a comparatively rare sight to see an Illinois Central refrigerator in a freight train on another railroad.

Although there are other railroads that could be classed to a certain extent in the same category with the three cited above, and some of these, like the Rock Island, for instance, are beginning to operate refrigerator cars of their own on a large scale, yet there are a great many railroads whose rails are in a particular section of the country, which could not begin to afford it. The south-

eastern roads furnish the best example of this. An official of the Central of Georgia testified that if his road were obliged to furnish cars for the peach traffic, it would have required in the year 1904, about 1700 or 1800 cars, which would have meant an outlay of about $2,000,000, and this for a season of only about six weeks duration.[1] Fruit refrigerator cars can not ordinarily be used for other kinds of traffic,[2] and if all roads were obliged to furnish cars, there would be no chance for a single road to let its cars out when it did not need them itself. The above official also mentioned the fact that in some years the peach crop is a failure, and that then there would be no use for the cars at all. The same condition exists in the case of the Southern Railway, the Seaboard Air Line, and also in trunk-line territory, and in New England. Mr. Midgley has said in this connection:[3]

> It is worse than folly to becloud the issue by statements that railroad companies could afford separately to provide the special cars that are now controlled by private companies. No sane man would advocate individual action; but they can proceed jointly, and thus resume functions which have been usurped by shippers and other private-car owners.

This quotation from Mr. Midgley brings us to the second method that has been suggested—namely, the formation of an equipment company to take over all

[1] Before the Interstate Commerce Commission, October, 1905.

[2] An agent of the Japanese Government consulted the superintendent of the Armour Car Shops in Chicago in connection with the installation of refrigerator service in Japan, but he was discouraged when he learned that different kinds of cars had to be built for the fruit traffic and for the beef traffic, and that they could not be used for ordinary freight when not needed for perishable traffic.

[3] *Railway Age*, vol. 34, p. 549.

private-car lines. It has been said that railroads could afford to own cars, because they could pay for them with what they now pay in the form of mileage. Of single roads, this is not true, but of all railroads taken together, it is true, and herein lies the ideal solution of the whole question—provided it is possible to bring about such a sweeping change. The advantage of such a system would be that the controlling company could distribute the cars among different sections of the country at the times they are needed, and on account of the great varities of climate the equipment could be kept in almost constant use. Analogous to this is the present organization of all private cars in the passenger traffic in the hands of the Pullman Company. To place all freight cars in the hands of a large private company, however, would mean the continuance of the present system of private cars on a larger scale, and with increased power to do evil. Much more defensible is the proposal to have such an equipment company owned and controlled jointly by the large railroad systems of the country. Mr. Midgley told the Interstate Commerce Commission in 1904 that he had parties in New York that were willing to put up $50,000,000 to absorb private cars so that they could be controlled and owned by the railroads.[1] The existence of powerful vested interests in the private-car business undoubtedly precludes such a solution, however, and there is not much chance of bringing it about until the operations of private cars are made much less profitable than they now are, either through government interference or through a change of policy by the railroads. In connection with this point, it is interesting to note that the *Railway Age* in an editorial in 1902 suggested

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[1] I. C. C., October, 1904, *Hearings*, p. 20.

two possible remedies: first, the consolidation of all private cars under a single corporate management, it being understood that in no case would the cars of shippers be hauled by the railroads; and second, to transfer the ownership of private equipment to the railroads, unite with it all of the corresponding special equipment owned by them, and handle the entire lot through the agency of a clearing house.[1] This suggestion to pool the equipment and handle it through a central clearing house, leaves little to be desired from an economic point of view, but is somewhat in advance of the times. The pooling of all freight equipment has frequently been urged, and the *Railway Age* is optimistic enough to believe that eventually a general car-equipment clearing house will be established. The benefits that would accrue from such a system are even more manifest in the case of special-equipment cars than in the case of freight cars in general.

The proposal to place all private cars on a *per diem* basis instead of the mileage basis of rental, emanates from Mr. Midgley. It was largely through his efforts that the change to *per diem* was effected in 1902 for all railroad-owned freight cars. He considers it a great mistake that private cars were not included in this change. The situation wherein railroad cars earn only 20 cents a day,[2] and private cars earn frequently 50 cents to one dollar a day, appears anomalous, inasmuch as the special equipment of the private companies costs but little more than ordinary freight cars. The fact that there is an interchange of freight cars by the railroads,

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[1] *Railway Age*, vol. 34, p. 516.

[2] On July 1, 1907 all railroad-owned freight cars were put on a *per diem* basis of 50 cents a day, but steps are now being taken (Feb., 1908) by the American Railway Association to reduce it to 25 cents.

with payments offset largely by receipts, detracts from the significance of this contrast, however. Mr. Midgley recommended in 1902 that refrigerator and tank cars be subject to a *per diem* charge of 30 cents, and stock cars and all other private cars 20 cents. On this basis he estimated that there would be an annual saving to the railroads of the country of $6,450,636.76 in car rental.[1] Later on, in 1904, he stated to the Interstate Commerce Commission that his solution was to put refrigerator cars on a 50-cent basis, and stock cars on a 30-cent basis. Mr. Midgley also expressed his belief that arrangements of this sort could be brought about. Suffice it to say that this would be an efficient method of curtailing the excessive earnings of private cars, and of making their returns correspond more nearly to a just percentage of their value. The difficulty, or even impossibility of making such a change at present, is clearly evidenced by the fact that Mr. Midgley, after a crusade lasting more than a year, was obliged to abandon the task. As the representative of some of the most powerful railroads in the country he had undertaken it, but no single railroad dared to let itself be identified with the movement, and although they furnished him with information and statistics, he could not use the names of railroads doing so in his articles. His influence was so great that his office, which is across the street from the Armour offices in Chicago, was practically abandoned by railroad men, none of them daring to appear there for fear their roads might be identified with the movement. The pressure at last became so great that he was obliged to abandon the whole project.[2]

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[1] *Railway Age*, vol. 34, p. 677. See also vol. 36, p. 619 *et seq*. for an elaborate discussion of the possibilities of effecting this change.

[2] From a personal interview with Mr. Midgley in 1906.

The fourth remedy under consideration is the extension of government control over private-car lines by making the Interstate Commerce Act apply to them. The legislation of 1906 has partly done this, and its effects will be more fully described below. To understand the entire significance of the recent changes, it is necessary to enter more in detail into the attitude of the Interstate Commerce Commission, the extent to which it has been able to reach private cars under the law, and the legal and constitutional questions involved. Many opinions of the Commission have been cited, but questions concerning its jurisdiction have been purposely omitted in order not to confuse the reader.

As early as 1887, in its first annual report,[1] the Interstate Commerce Commission referred to the growing use of cars not owned by railroads, and the likelihood of the growth of a powerful system of such cars which would not be under the control of any legislation existing at the time. In this way the Commission announced its opinion that the Interstate Commerce Act of 1887 did not apply to private-car companies, and it recommended that a further designation of the agencies in transportation which should come under the supervision of the act should be made. This recommendation was repeated in 1889 and in 1890 by declaring that the payment of car mileage for the use of cars of private companies or individuals should be regulated by suitable provision. During these first years a few cases involving the use of private cars were investigated and decisions rendered thereon by the Commission, but all of them involved questions of discrimination by the railroads, and thus came under the jurisdiction of the Commission. In its

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[1] Page 15.

report for 1891 the Commission devoted much space to a discussion of the use of shippers' cars, denounced the discriminatory practices which resulted therefrom, and referred the matter "to the wisdom of Congress, should it see fit to act, without any special suggestion from the Commission."[1] The Commission has always been very severe in its criticism of the practices of private cars, and it has continually chafed under its inability to reach them through the law. Private companies were not made common carriers by the Interstate Commerce Act, and consequently the Commission has been powerless to inquire into their financial operations.

The imposition of heavy icing charges by these outside companies raised an important question of jurisdiction. The car-line representatives and attorneys have always claimed that icing is a local service, not a part of interstate traffic, and, therefore, not under the supervision of the Government. The Commission, on the other hand, has always claimed that the icing charge is a part of the transportation rate, and, therefore, under the purview of the Commerce Act. The first decision on this point was rendered in 1895 in a case involving rates and refrigeration charges on strawberries from the Carolinas to northern points. The Commission said, in part, as follows:

> It is the duty of the carrier to furnish an adequate and suitable car equipment for all the business it undertakes, and also whatever is *essential* to the safety and preservation of the traffic in transit. When carriers undertake the transportation of perishable traffic requiring refrigeration in transit, ice and the facilities for its transportation in connection with that traffic are incidental to the service of transportation, and the

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[1] Page 41.

> charge therefore is a charge "*in connection with*" such service within the meaning of section one of the act to regulate commerce, in respect to the reasonableness of which the carrier is subject to that provision of the statute.

The Commission then went on to declare certain icing charges excessive, and to pronounce a fair maximum rate for the same, in accordance with the power the Commission exercised at that time prior to adverse court decisions.[1]

This decision of the Commission went uncontested at the time, but it did not settle the matter, because the same question as to jurisdiction over icing charges came to the front in both the California and Michigan fruit cases, known respectively as the Orange Rate cases, and the Michigan Car Line case, which have been frequently referred to above. In its decision in the Michigan case in 1904, the Commission held that it was a part of the common-law liability of railroads to furnish refrigerator cars for perishable traffic in fruits and vegetables, but that they may provide such cars either by purchase or by lease; that carriers should, in the opinion of the Commission, be under legal compulsion to furnish ice for refrigeration, but when they do not, the charge for refrigeration becomes part of the total charge for transportation, and must be reasonable; furthermore, that such charges should be published and adhered to exactly as all other charges for transportation are published and observed.[2] The same principles were reiterated in the decision of the Commission in the California case in 1905.[3]

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[1] *Int. Com. Rep.*, 1895, p. 210 and 6 *I. C. C. Rep.*, p. 295.

[2] *Int. Com. Rep.*, 1904, p. 300. For full text of decision see 10 *I. C. C. Rep.*, p. 360.

[3] *Int. Com. Rep.*, 1905, p. 114 or 10 *I. C. C. Rep.*, p. 590.

Although in these cases the Commission stated its opinion that it had jurisdiction over icing charges, it refrained from issuing an order. Consequently the matter has not been taken to the courts, and the point has never been judicially determined. The car companies continued to deny this power to the Commission, and asked for an order so that they might take the matter to court and procure a final decision. Without discussing the opposing arguments and the possible outcome of the matter if it had gone to the courts, suffice it to say that the question was put to rest by Congress in 1906, when in its rate law it included in the definition of transportation, "all services in connection with the receipt, delivery, . . . ventilation, refrigeration, storage, and handling of property transported." The inclusion of the single word "refrigeration" had the result of definitely adopting the contention of the Interstate Commerce Commission, as quoted in the cases above, and now icing charges are accordingly published by the railroads in their tariffs. Representatives of fruit merchants spent much time and energy in Washington at the time of the discussion in Congress attempting to secure the insertion of much more drastic clauses in the rate bill, and they were somewhat disappointed that they succeeded in having but a single word incorporated in the measure. The result, however, is far-reaching, and cannot but alleviate the abuses incident to refrigeration charges.

In January, 1906, shortly before the passage of the Hepburn Act, there was one court decision, which although it did not deal specifically with the question of supervision over refrigeration charges, extended the jurisdiction of the Commission in an important respect. This is the case referred to above,[1] which grew out of a

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[1] *Cf. supra.*, p. 163.

refusal on the part of certain stock-car owners to answer questions concerning the payment of rebates. The defendants maintained that the Interstate Commerce Act applied only to corporations which were common carriers, and not to outside, private corporations. The decision of Judge Landis[1] upheld the power of the Commission to compel witnesses to answer questions, and said that the Interstate Commerce Act was designed to regulate *commerce*, and not *particular corporations*, and that therefore the Commission has jurisdiction not alone over the common carrier, but also over private-car lines and every other person or thing that can in any way interfere with the enforcement of the statute, which provides for uniformity of freight rates. In other words, it was the opinion of the court that the Interstate Commerce Commission has the power to inquire into the practices of private-car lines, in so far as they directly affect freight rates, and furthermore explained that by the freight rate is meant the net charge for transportation to the shipper. The decision might have had an important bearing on the question of refrigeration charges, if it had not been for the definite settlement of the question by legislation shortly afterwards, but it went even further than the Hepburn Act in some respects in extending the jurisdiction of the Commission over private-car lines.

As a result of this decision and of the Hepburn Act, the jurisdiction of the Interstate Commerce Commission has been extended over the affairs of private-car companies in so far as they affect freight rates, discriminations and rebates, and refrigeration charges. A further result of the Hepburn Act has been that private-car lines

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[1] 145 *Fed. Rep.*, 235.

deal exclusively with the railroads, rather than with the public. Many of the abuses have been due to the fact that car companies have made their arrangements directly with shippers, arrangements which have been beyond the pale of the law, because private-car lines are not common carriers engaged in interstate commerce. Contrary to the opinion of many, they have not been made common carriers by the recent legislation, and there is no reason why they should be, because they are not transporters of products, but merely lessors of cars to the railroads. The common-law liability of railroads to furnish equipment is fulfilled through leasing cars, and private-car companies stand in the same relation to them technically as do all car-equipment companies. Since they are not common carriers, the Commission cannot investigate their private affairs, such as earnings, capitalization, *etc.*, unless, as stated above, their practices directly affect freight rates (the icing charge being considered a part of the freight rate).

From the foregoing it will be seen that the fourth proposal under discussion in this chapter, the extension of government control over private cars, has been brought about to a considerable extent by recent legislation. In fact, many believe that the whole problem has been solved. Certain it is that the agitation has perceptibly subsided during the last two years, and the prospects are that private cars will cause much less trouble in the future than they have in the past. Government regulation seems to be the surest and safest remedy, and it is likely that most of the objectionable features will disappear within a short time. One important phase of the question, however, remains untouched, and there is no immediate prospect of a solution. This is the excessive mileage earnings of cars

cars, and these abuses have been fast disappearing during the last few years. Since privately-owned cars are almost entirely of special design, built to carry particular commodities for which the equipment of the railroads has proved inadequate, they are performing a valuable service in furthering the industrial growth of the country. In July, 1906, there were about 380 different private-car companies enumerated in the *Railway Equipment Register*, some of these owning only two, five or ten cars each, and about 40 of them owning 500 cars or over. Manufacturing concerns of many different kinds own cars for their special and peculiar uses, and this is but a natural phase of the more efficient, large-scale organization of our productive forces.

Traffic in perishable and other commodities requiring specially-designed cars made its appearance but a comparatively short time ago, and there will undoubtedly be a tremendous development in this direction in the future. Special-equipment cars will be needed more and more, and it is doubtful if the supply will keep pace with the demand. Judging from present indications, the railroads will probably take the lead in the future in furnishing such equipment, and the number of private cars is not likely to increase to any great extent. The supplanting of Armour equipment on the Harriman Lines has seriously reduced the operations of Armour and Company's fruit cars, and that company has ceased for the present to add to its equipment. The increasing railroad ownership of refrigerator cars will tend to discourage the building of such cars in large numbers by private companies on account of the uncertainty in finding use for them. Officials of the refrigerator-car departments of various railroads met but recently (Feb. 5, 1908), to form an association known as the Railroad Re-

frigerator Car Service Association, for the purpose of formulating through mutual coöperation a standard code of rules regarding preparation of cars, inspection of contents, way-bill instructions, shipping directions, *etc.*, and to keep in touch with all new appliances and tests. This is an indication of the attention that the railroads are paying to the matter, and of the probable line of development in the future. A wise step would be for connecting roads to consolidate their special-equipment cars, or to build them coöperatively, and thus develop through-lines analogous to the fast-freight lines. It is hazardous to generalize too freely about the future, however, until the effects of recent agitation and legislation have had time to show themselves more definitely.

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OHIO BEFORE 1850

A Study of the Early Influence of Pennsylvania and Southern Populations in Ohio

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OHIO BEFORE 1850

A Study of the Early Influence of Pennsylvania and Southern Populations in Ohio

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PREFACE.

The freedom of the individual and the broad basis for democratic representative government in the United States developed not in the older states but for the first time on the extending frontier of the Middle West. The contributions made to this social movement by the early populations of Ohio from Pennsylvania and the South form the subject of this paper. In the discussion the topics are presented in the following order:

The physical environment was of fundamental importance. It reacted upon the settlers and they, in turn, became masters of material things. By this process was shaped their progress along political, religious, educational and social lines.

Of no less importance were the sources from which the streams of westward migration were rising. Those who came from New England and the coast regions of the South were leaving the conservative societies in search of more freedom or better economic opportunity. The back-country of the older states contributed a strong, aggressive, individualistic type. The new environment emphasized these same qualities. Success depended upon industry and individual initiative.

In political and social organization the pioneers from the first revealed the qualities indicated above. Aristocratic control by the territorial government was opposed. The new state constitution incorporated manhood suffrage, popular control through the legislature, and elec-

tion of local officers by the people. The settlers were loyal followers of Jefferson.

The controversy over slavery emphasized the intimate social and business relations of southern Ohio with the South. Slavery was excluded and immigration of free negroes discouraged mainly on economic grounds. Agitation against slavery was begun early in the State and was carried on by individuals and groups with little opposition until after 1830. When the friendly and business relations with the South were threatened, individual liberty and freedom of speech were suppressed in southern Ohio by social pressure and even by mob violence. With this opposition the anti-slavery forces increased.

The settlers brought their religious beliefs with them. Sects in Ohio multiplied and toleration was the rule. The right of the individual to become a dissenter was recognized. Many and interesting were the changes wrought in the organizations of the churches by the democratic environment of the frontier. Religion was compelled to adapt itself to the economic life and political ideas of the time and place.

Conduct was at first individualistic and independent. There was freedom from the conventions of older societies. But contact and relations with groups modified personal character. Social pressure was exerted to preserve the interests of the whole community.

Education began as a local interest largely in the hands of private persons or religious sects. The price of learning was persistent individual effort. Conditions of the frontier and the traditions of the settlers long rendered public instruction inefficient and inadequate. Slowly a common system for the whole State was evolved.

Coöperation at first was intermittent and narrow in

its scope. Common interests developed over wider areas and communities began to coöperate for the welfare of all. The policies of common action, when they were inaugurated, were determined not by the arbitrary control of an aristocratic class but through the forms of democratic government by the people themselves.

Thus the early settlers in Ohio are shown to have achieved a larger degree of freedom for the individual and a wider participation in affairs of government than had yet existed in the older states of the East. Incidentally the evidence shows that, important as have been the contributions of the Puritans to our character and institutions, to others must be given the credit for securing the recognition of individual liberty.

ROBERT E. CHADDOCK.

COLUMBIA UNIVERSITY, *March 10, 1908.*

CONTENTS

CHAPTER I

EARLY MATERIAL DEVELOPMENT

PAGE
1. Natural ways of communication 13
2. Centers of settlement within the Territory 14
3. Artificial ways of communication 16
    (1) Zane's road and its effects 17
    (2) The Cumberland Road and its advantages 19
4. Progress in river transportation and its significance for prosperity 21
5. Census of manufactures in 1822 22
6. Canals in Ohio and the effect upon agriculture, mining, commerce, manufacture, wealth and population 23
7. Rise of towns and cities—Cincinnati 27
8. Conclusion 29

CHAPTER II

SOURCES OF OHIO'S POPULATION BEFORE 1850

1. The frontier at the close of the 18th century 30
2. The Scotch-Irish on the frontier 31
    (1) Squatter settlers in southeastern Ohio 33
    (2) Westward movement into Ohio 33
3. The Germans on the frontier and in Ohio 34
4. The Quakers—Movement to Ohio 35
5. Influence of early military expeditions 37
6. Statistics from census of 1850—Conclusions 39
7. Evidence from county histories 42
8. The nativity of members of the Ohio legislature, representatives and senators in Congress—Conclusions 43

PAGE

CHAPTER III

Democracy and Individualism Triumphant over Federalist Ideas

1. The territorial stage of government 47
  - (1) Isolation and lack of unity 47
  - (2) Quarrels with the governor over local affairs—Dissatisfaction with centralized control 50
  - (3) Contrasts in southern Ohio between New England and other settlements 51
  - (4) System of land-holding made more democratic 54
  - (5) Territorial legislature established—Government still aristocratic 55
  - (6) Opposition to the existing régime, and agitation for statehood—Bitter controversy—Real point at issue was the principle of government 57

2. The first Ohio constitution 62
  - (1) The convention and the points at issue—Controlled by the Jeffersonian party—Chillicothe group of southern men and their supporters 62
  - (2) The constitution itself analyzed to show democratic tendencies and provisions as to franchise, legislative power, local elections, *etc.*—Comparison with Pennsylvania and Kentucky 64

3. Further developments of democracy 68
  - (1) Republican control of the new state government . . . 69
  - (2) Excessive powers of legislature and results 69
  - (3) States' Rights doctrine applied in Ohio 73
  - (4) Local government a composite system 76

CHAPTER IV

The Problem of Slavery and the Free Black Projected into Ohio

1. Controversy in the territorial stage and in the constitutional convention 78
  - (1) Efforts to introduce slavery—Exclusion final 78

2. Legislation as to negroes under the constitution 81
  - (1) Attitude of Ohio settlers toward free negroes 81
  - (2) Laws passed in 1803 and 1807 with purpose of limiting immigration of negroes from the South 82
  - (3) Laws enforced in Cincinnati in 1829—Persecution of negroes 84

PAGE

(4) State fugitive-slave law of 1839 passed at request of Kentucky 86
(5) Attitude towards negroes in constitutional convention of 1850 87
3. Growth of anti-slavery ideas before 1830 88
(1) Agitation through religious denominations, organized societies, and the press—The scheme of colonization—These movements originated in the South itself or in the border states, and early affected Ohio 88
4. More radical abolition and anti-abolition in Ohio 95
(1) Development of abolition agitation illustrated from the life of James G. Birney—Mob in Cincinnati 95
(2) Reasons for anti abolition feeling in southern Ohio . . . 97
(3) Lane Seminary debate and secession to Oberlin 99
(4) Growth of anti-slavery societies 100
(5) Change in attitude of churches of southern Ohio 100
(6) Attitude of the state legislature toward abolition . . . 102
5. The underground railroad, and the national fugitive-slave law of 1850 103
(1) Rise of the underground system in Ohio—Results . . . 103
(2) Invasion of the liberties of Ohio citizens—State pride began to assert itself—Pressure from South 105
(3) Fugitive law of 1850 passed at insistence of South—Effect on attitude of Ohio—States' Rights asserted—Factions within state unified in opposition to slavery . 107
6. Summary and conclusion 109

CHAPTER V

EARLY RELIGIOUS INFLUENCES IN SOUTHERN OHIO

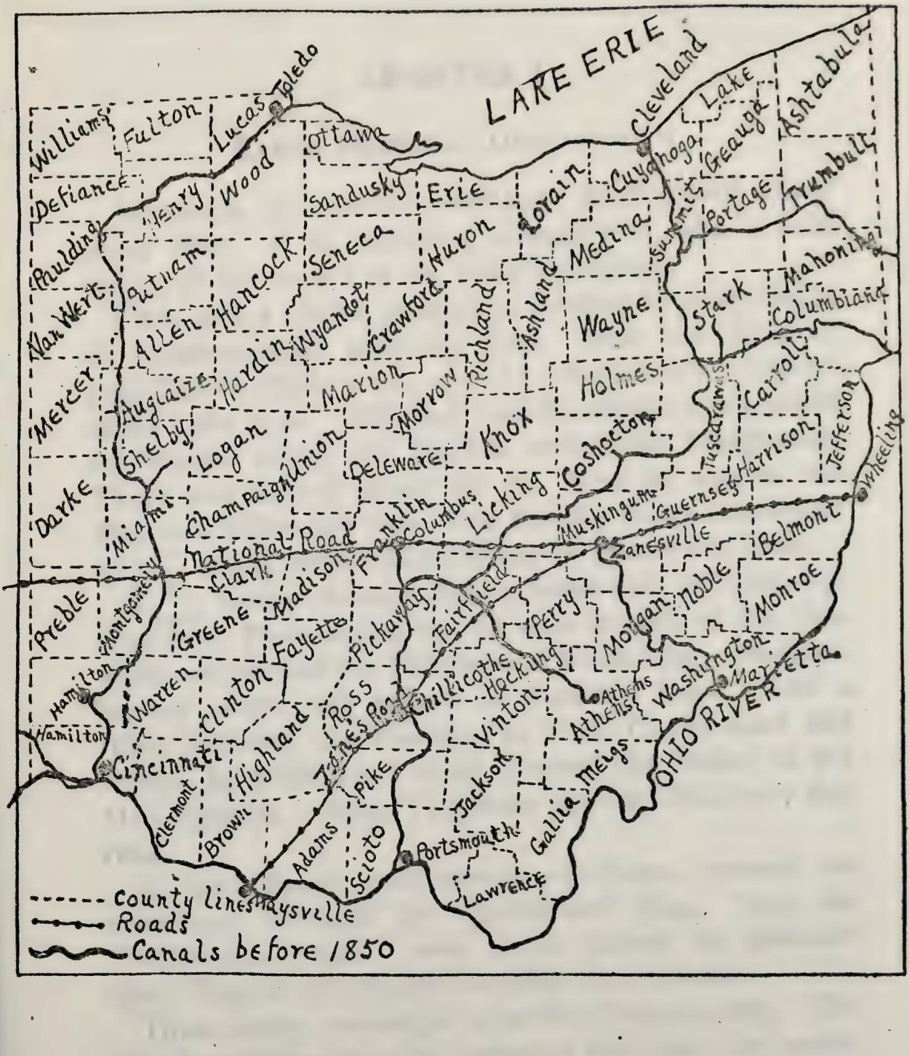
1. Introduction 111
(1) Toleration in Pennsylvania and the South 111
(2) Presbyterians—Methodists—Baptists 111
2. Introduction of religious societies into Ohio 111
3. The Kentucky revival of 1800 and its effects 114
(1) Conditions under which it started—The revival itself . . 114
(2) Effect upon the Methodist and Baptist churches 116
(3) Divisions within the Presbyterian church—The "New Lights" organized on more democratic principles—Spread of this sect in southern Ohio—The Cumberland Presbyterian sect organized 117

PAGE
(4) The emotionalism, characteristic of the revival, persisted in other lines of social action—Shown in Ohio in political excitement, in execution of justice, and in the slavery controversy 120
4. Further developments within the State 123
  (1) Growth of the three denominations above described—The Methodists most numerous 123
  (2) The Methodist Protestant church organized 124
  (3) The followers of Alexander Campbell separated from the Baptist church—More democratic in organization . 124
  (4) Sects in Cincinnati in 1846—Clash of creeds 126
  (5) Statistics from county histories—The Census of 1850 showed relative strength of sects by counties . . . 127
  (6) Conclusion 129

CHAPTER VI

Early Social Life and Education in Ohio

1. Frontier social and anti-social conduct as shown in Ohio 130
  (1) Evidence of social pressure from early statutes 133
  (2) Temperance considered by constitutional convention of 1850—Clause in second constitution 135
2. Education a factor in the State's progress 138
  (1) Private schools, academies, and small colleges 139
  (2) Development of free common schools 141
  (3) Other means of education—Debate—Platform—Press . . 147
  (4) Cincinnati, the center of culture in the state 147
  (5) Conclusions—Letter of William E. Channing 150
3. General summaries of the chapters and conclusions 151


LAKE ERIE
Toledo
Cleveland
Williams
Fulton
Lucas
Ottawa
Defiance
Henry
Wood
Sandusky
Erie
Lorain
Cuyahoga
Lake
Geauga
Ashtabula
Trumbull
Paulding
Putnam
Hancock
Seneca
Huron
Medina
Summit
Portage
Van Wert
Allen
Wyandot
Crawford
Richland
Ashland
Wayne
Stark
Mahoning
Columbiana
Mercer
Auglaize
Hardin
Marion
Morrow
Holmes
Carroll
Tuscarawas
Jefferson
Shelby
Logan
Union
Deleware
Knox
Coshocton
Harrison
Darke
Miami
Champaign
Franklin
Columbus
Licking
Muskingum
Guernsey
Wheeling
National Road
Clark
Madison
Zanesville
Belmont
Preble
Montgomery
Greene
Fayette
Pickaway
Fairfield
Perry
Morgan
Noble
Monroe
Hamilton
Hamilton
Warren
Clinton
Ross
Chillicothe
Hocking
Athens
Athens
Washington
Marietta
OHIO RIVER
Zanes Road
Vinton
Highland
Cincinnati
Clermont
Brown
Pike
Jackson
Meigs
Gallia
Adams
Scioto
Portsmouth
Lawrence
Maysville
County lines
Roads
Canals before 1850

CHAPTER I

Early Material Development

Material prosperity conditions development along other lines. It is, therefore, necessary to take a brief survey of this aspect of the State's progress.

Ohio held a unique position in relation to early means of communication with the East. Over one hundred years before Marietta was settled La Salle in the "Griffin" sailed Lake Erie. Ohio had been discovered and claimed for France before the English scaled the Alleghenies. There was natural access to the West by way of the Mohawk Valley and Lake Erie but this route was closed by the hostile Indian Confederacy in New York State.

Three routes through Pennsylvania met at Pittsburg. One from Philadelphia by the west branch of the Susquehanna reached the Allegheny at Kittanning. Another, further south, was known as Forbes's Road. Still a third followed the Potomac to Fort Cumberland and thence, by Braddock's Road, crossed the divide to the Monongahela. Many Virginians came to Ohio over this road.

In 1775 Boone, with twenty woodsmen, crossed the mountains through the Cumberland Gap. Thus the "Wilderness Road," over which passed the pioneers from Virginia and North Carolina, was opened.

These routes converged upon the Ohio country. The State's northern shore was swept by the Lake; her southern was washed for five hundred miles by the great trib-

utary of the Mississippi; the streams within the state, flowing south and north, furnished navigable waters far up their courses for the early craft; and the low portages, in east, center, and west, connected the Muskingum with the Cuyahoga, the Scioto with the Sandusky, and the Miamis with the Maumee.

Within this territory were established at least five separate centers of settlement which attracted people from four distinct regions of the country. It was natural, therefore, that the early settlers should be very different in physical type, in social and religious customs, in political ideas, and in personal ideals. These differences were perpetuated in the new and long isolated settlements where were gathered, into the narrower limits, the various elements and experiences that went to make up the larger nation.

As in every new country, the pioneer was largely at the mercy of his environment. He came by the routes already marked out, felled the forests, locate[illegible]bin by stream or trail, manufactured the necessar[illegible]ome, and lived in primitive fashion isolated from his neighbors. His struggle with nature occupied all his attention for a time until progressive control over his surroundings yielded a surplus to be expended in progress.

Many daring pioneers from Pennsylvania and Virginia before 1785 planted "squatter settlements" beyond the Ohio River in the Northwest Territory.

After 1787 permanent settlement began. The second Ohio Company had purchased lands of the United States on the Muskingum river. The same year the directors of this company decided to establish a settlement on the Ohio. Under the leadership of Putnam workmen were selected and tools, wagons and horses collected. Starting from Danvers, Massachusetts, they came over the

Alleghenies to the headwaters of the Ohio. One month passed in tedious journey by wagon, and then on a boat of fifty tons burden, constructed by their own workmen, they launched on the Ohio, reaching their future home at Marietta, April 7, 1788. There were only forty-eight persons on this "Mayflower" of the West but the number of settlers had increased in 1800 to 5,000 within Washington county.

During the same year in which the Northwest Territory was opened, Symmes of New Jersey secured a large tract of land between the Miamis. From his home he carried thirty colonists in wagons across the mountains to Maysville, Kentucky, and thence by boat dropped down to the site of Cincinnati. Here, opposite the mouth of the Licking and where the great Indian trail crossed the Ohio, the future metropolis was founded. The fertile agricultural region back of Cincinnati rapidly filled with settlers from New Jersey, Pennsylvania and the South.

Between the Scioto and the Miamis, and stretching far inland, Virginia had reserved 6,570 square miles of territory with which to reward her war veterans. The settlement of this area projected Virginia, Kentucky and North Carolina into the midst of the Territory along the river courses mentioned. Chillicothe became the chief center, laid out by Nathaniel Massie and settled rapidly by the incoming pioneers from the South.

Meanwhile Connecticut had retained a reserve in the northeastern part of Ohio. To this section of the State, as to Marietta, New England settlers came bringing their institutions and traditions with them. In 1796 Moses Cleveland headed a party of fifty-two persons whose task it was to survey the Reserve. Their route of travel was by way of Buffalo and Lake Erie, landing at Conneaut, and finally reaching the site of Cleveland which was to

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become, a half-century later, the great industrial and commercial center of the northern part of the State. Settlement in this region, however, was so slow that by 1800 only 1300 people resided on the whole Reserve, covering the area of several counties, as now divided. The northern route was not used extensively by migrating settlers until after the War of 1812 and the opening of the Erie Canal in 1825.

The "Seven Ranges," located in southeastern Ohio, bordering on the river, were soon fast filling from Pennsylvania and Virginia as the hardy pioneer stock of Germans and Scotch-Irish pressed forward.

Thus came the early settlers to these five isolated centers, bringing with them the heritage peculiar to the region from which they came.

Four of these centers we have described, bordered the River which gave them access to each other and to the outside world. The settlers soon turned their attention to the construction of artificial means of communication both within and outside the State. Then would they be enabled to penetrate the interior, away from river and trail. The first continuous road through the State was "Zane's Trace," passing from Wheeling, on the boundary between Virginia and Ohio, in a southwesterly direction to a point opposite Maysville, Kentucky, on the Ohio River. The Zanes had founded Wheeling in 1770, a strategic point in the valley because of its advantages for trade with the interior. Here the pioneer multitude coming from the East might diverge from the water-route and keep on across the interior of Ohio if only a road could be opened. The bargemen too who floated down from Pittsburg to Kentucky and the Mississippi country often sold their boats rather than toil back against the currents of the river, and returned by land

across the State. The government had opened a river mail service from Pittsburg to Cincinnati in 1794 but it proved very dangerous and unsatisfactory. An overland route was needed because the settlers had pushed up the tributary streams fifty miles from the Ohio, and these settlements must be connected by a great through highway in order to open up what was then the garden spot of the State.

Accordingly in 1796 the government authorized the Zanes by Act of Congress to begin work on this road. By clearing away trees and undergrowth it was soon opened for pack animals but the first team did not pass over it from Maysville to Chillicothe until two years later. Thereafter by this road the merchant passed every spring to and from the East. His goods, purchased in the East, were conveyed by wagon to Pittsburg and brought down the Ohio River at an expense of from three to five dollars per hundred pounds. Soon corduroys were laid and the road widened to accommodate the traffic of immigrants from East and South. Along it passed the main land traffic through Ohio for a quarter of a century.

Zane's road became a prime factor in Ohio's development. It determined the location of homes, taverns and villages. Where it crossed the Muskingum by ferry, Zanesville grew up, at first only a keeper of the ferry and a few families as a nucleus, later a thriving town, and finally, with the growth of prosperity due to its location, one of the most prosperous centers of trade and industry in the State. Where the road crossed the Hocking, Lancaster was founded, while at the ferry over the Scioto the town of Chillicothe became the center of activity for the Virginia Military Lands and one of the early seats of State government. Between these places sprang up

numerous taverns for the entertainment of travelers. Around these were soon grouped a few pioneer cabins, and a village presently became a place to exchange news and a center of life for the surrounding community.

In like manner came the pioneers into Muskingum county. Thus also from Kentucky came the first settler into Pickaway county. Highland county received its first pioneer over the same route. The first arrivals in Fairfield county came from Kentucky but soon mingled with others coming, in ever-increasing numbers, from Virginia and Pennsylvania by this common means of approach to the interior. Family after family, coming from different regions, thus settled side by side in the country of their choice. Post-offices were soon established at Lancaster and Zanesville. The inland counties increased rapidly in wealth and population. In 1815 Ross county had 18,000 inhabitants, and was only excelled by the river county of Hamilton.

The grouping of the population with reference to ways of access is shown also in the division of the territory into counties during the period previous to statehood. Of the nine counties then formed, one bordered on Lake Erie, six bordered the Ohio river, and two occupied the south-central portion of the state, on Zane's Road and the Scioto river.

With the growth of trade between the rapidly developing agricultural West and the eastern markets, there appeared the great need for a well-built turnpike from the coast to this great storehouse in the interior. Washington had seen, as early as 1774, that the trade of this valuable western country was about to slip away down the river to the Spaniards. He at once advocated opening ways of communication between East and West as a "link in the chain of union." For these reasons,

therefore, provision was made, when Ohio was admitted into the Union, that a five per cent fund, derived from the sale of public lands within the State, should be set aside for the building of roads. It was later decided that three per cent be used for common highways in the various counties of the state, and the other two per cent be employed in the construction of a great national highway from tidewater to Ohio. By 1805 a considerable sum had already accumulated for this latter enterprise. Routes were considered by a committee, the one from Cumberland to Wheeling was recommended, and Congress authorized this first internal improvement on a large scale. The work was begun in 1811 and Ohio had accomplished its aim. The pike was completed to the Ohio River at Wheeling in 1818. Thus was afforded connection with the steamers now plying on the river and with the overland route through the State by way of Zane's Road. The land route was now complete between the East and the fertile eastern Mississippi Valley.

Hosts of emigrants were en route toward the West. Cabins beside the Pike became taverns, villages became cities as the tide of population moved forward. During a single generation the population of Ohio, Indiana and Illinois, through which the road finally extended, increased to over three and a half millions. The Cumberland National Road became the "nation's highway."

Wealth and comforts were more generally diffused as a result of the opening of better communication. In 1822 six business houses in Wheeling unloaded over 6,000 wagons averaging 3,500 lbs. each. It was estimated that every tenth wagon passed on into the interior of Ohio. These freighters carried back to the East flour, whiskey, hemp, tobacco, bacon and wool. Before the road was completed to Wheeling the trip took four

weeks from Baltimore and the freight rate varied from three to eight dollars per hundred pounds; in 1832 freight was carried at one-half the cost and in one-half the time on the Cumberland Road. This meant for the farmer of the West a profitable market for his surplus and so gave him an incentive to produce more.

Mail came in eight days from Baltimore before the road was opened; in 1832 it came by stage to Wheeling in forty-eight hours. In 1837, four years after the road was finished to Columbus, Ohio, the government required by contract that the trip be made from Washington to Columbus, Ohio, in forty-five and a half hours and to Wheeling in thirty hours. The trip could be made from Wheeling to Cincinnati in forty-eight hours which was faster than the packet on the river. In 1835 stages left Columbus daily for Wheeling, Springfield and Cincinnati, while those going north made the trip to Cleveland, Sandusky, Mt. Vernon and Norwalk every second day. There was also a daily line of mail coaches directly south to Chillicothe, connecting there with lines from Kentucky. Thus the net-work of roads was extending over the State and the facilities of stage-coach and tavern promoted travel and tended to draw the State together as a unit. Mobility of population in the end was sure to modify the sectionalism that was inevitable as long as the settlements remained isolated.

The Cumberland Road was a powerful factor in directing the flow of population. It was exactly in line with the rising westward movement from Pennsylvania through central Ohio; it was also used by settlers from Maryland and Virginia who were coming in ever-increasing numbers; and it connected with the head-waters of the Ohio so that travelers could complete their journey to the chosen settlement by water. The consequence

for Ohio was to divide the stream of immigrants, directing one along the southern boundary by river as before and guiding the other directly across the State. The southern and central counties rapidly increased their population and prosperity as a result.

Progress in river transportation also had great influence upon the State's prosperity. In the West, North and South were drawn early together by mutual trade relations. Before 1800 keel-boats and barges, moved by oars and poles and sometimes by sails, made but two trips to New Orleans in a whole year, carrying from fifty to one hundred tons burden. The early freight rates on the river were almost prohibitive, especially for bulky articles and those not absolutely necessary. Besides, the New Orleans demand was easily satisfied and the cargo, even if it arrived safely, might prove a drug on the market. Naturally, when the farmers of the Northwest Territory produced a surplus of grain they either converted it into flour or whiskey in order to reduce its bulk for shipment to the southern market. In return from New Orleans were brought supplies of groceries, lead and cotton.

The advent of the steamboat on western waters in 1811 marked a new era in river transportation. The time for the return trip from New Orleans was reduced to a mere fraction of what it had been before. Much larger vessels were constructed and the abundance of lumber and iron made ship-building profitable along the Ohio River. Rates on freight were reduced and the incentive to produce a surplus, in both agriculture and manufactures, was greatly increased. This revolution in river transportation came at the same time that the National Road reduced the land transportation rates to the East. This was especially fortunate for the southern part of the State because it enabled producers to com-

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bine the road and river transportation to and from the East, as well as supply the South with a part of their surplus. Prosperity increased and wealth accumulated especially in those counties which had ready access to the chief routes of travel, but many parts of the interior of the State had as yet no adequate outlet for any surplus they could produce. The land was very fertile but why produce when the wheat must rot for want of a market? Better communication was needed by a system of canals which would reach the interior counties and make available their rich resources.

The first United States Census of Manufactures was issued in 1822. The statistics indicate that manufacture was still carried on mainly in the frontier homes. But in most of the counties there were a few staple articles manufactured in centers devoted to that purpose. The factory system was beginning to take the place of the home handicrafts, but the capital invested was still very small. Flour, whiskey, leather and lumber were widely produced, while woolen goods, iron products, salt, paper and packing products were confined to specific localities. This is as we should expect, for grain, being a widely distributed crop, was generally converted into flour or whiskey for shipment. Lumber was abundant and could easily be conveyed to the mills along the streams or down the Ohio. Leather was a common necessity for footwear and harness, and the raw material was close at hand. The manufacture of woolen goods and iron products was carried on in places where there was access to a supply of the raw materials, to the water-power to run the mills, and to a market for the finished products.

An examination as to what counties had the most capital invested in manufactures in 1822, showed that Muskingum county had over a half million. This county

contained the thriving town of Zanesville, and was well situated both as to river and land transportation and the sources of raw materials. Hamilton county, with Cincinnati as its chief town, needs no explanation to account for its large capital in manufacture. Ross county came next, located on the Scioto river and Zane's Road. Scioto, Washington and Jefferson counties were all located on the Ohio and thus accessible to markets East and South. The counties in the rich Miami valley had the best early water and road connections in the state, and were tributary to Cincinnati, where their trade found an outlet to the Ohio River. The towns having the most population, as well as the best facilities, had of course the most capital invested in manufactures, *i. e.*, Cincinnati, Zanesville and Chillicothe.

It must be remembered that the tariffs of 1816, 1824, 1828 and 1832, promoted manufactures in Ohio and rendered a more extended market for products necessary. The extension of the slave system in the South and the specialized production on the cotton plantations produced a market for food supplies and manufactured goods from the Ohio Valley. The very expansion of slave labor in the South made possible the extension of free labor in the North. The financial interests of both regions seemed thus to be harmonized and the steamboat was the connecting link.

In 1825 the Erie Canal opened the northern route to the East and made New York City the depository for the products of the West. This made possible the development of commerce on Lake Erie and the opening of a canal system within the State of Ohio, a means of communication long needed by the interior. Between 1830 and 1850 the state and private companies constructed 1000 miles of canals in Ohio, connecting Lake Erie and

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the River by two continuous routes, the eastern one with termini at Cleveland on the Lake and Portsmouth on the Ohio, the western route leaving the Lake at Toledo and reaching the Ohio at Cincinnati. Thus thirty-seven counties of the State were actually reached and many more so closely connected as to reap almost equal benefits.

Agriculture, mining, commerce and manufacture were promoted; the State's population and wealth increased rapidly; the prices of labor and products were higher: the State became more a unit than ever before, and finally trade and manufacture began to concentrate at certain populous centers where facilities were greatest, giving rise to important towns and cities.

In 1850 Ohio stood third among the States of the Union in the cash value of her farms, and had become a chief source of supply of animal products for the East and South.

Cincinnati had developed into the chief packing center of all the West, and retained that position until 1860 when Chicago became the successful rival. The rich farming region of the Miami and Scioto valleys furnished the raw materials. Cattle and hogs were no longer driven to the markets of the East, but were killed at home and transported by canal and river to the East and throughout the Mississippi Valley. Other smaller packing centers were developed at Columbus, Chillicothe, Circleville and Hamilton, each on the canals. The census figures for 1850 showed thirty-three counties in the state with farms and improvements in each valued at five millions or more. Of these, eighteen were situated on canals, one on Lake Erie and four on the Ohio River. The county of Hamilton in the southwestern part of the state exceeded all others with seventeen and one-half millions

in farms and improvements, because of its superior location and means of communication by canal and river.

Mills were built along the canal banks for the manufacture of woolen and cotton yarn and cloth, for grinding wheat into flour, and for the manufacture of lumber products. By 1840 the annual value of products from grist and saw mills was almost nine millions, and in 1850 the value of cotton and woolen products had reached one and one-half millions.

Immense crops of corn, together with developing transportation facilities, increased the manufacture of liquors, especially in the region of Cincinnati. In 1850 three and one-half million bushels of corn were thus transformed. The aggregate product was four million gallons of ale and twelve million gallons of whiskey and wines.

The canals brought about the early development of the salt supply in the counties of the southeastern part of the state and permitted the opening of the coal mines by offering cheap transportation. The production of coal alone amounted to eight million bushels in 1850. Iron manufacture was stimulated by the improved transportation which made it possible to secure the raw materials and ship cheaply the bulky products.

In 1822 the total capital invested in manufactures was four million dollars; in 1850 it had grown to twenty-eight millions. The canal counties owned a much larger proportion of this capital than the non-canal counties. Hamilton county, as we should expect, ranked first, with at least one-fourth of the total.

In the period from 1833 to 1860 the grand totals of arrivals at the four great terminals of the canals, *i. e.*, Cincinnati, Cleveland, Toledo and Portsmouth, were as follows:—

Wheat	45,754,761 bu.	Pork	2,005,520 bbl.
Corn	52,188,288 bu.	Whiskey	1,598,845 bbl.
Oats	789,941 bu.	Coal	50,341,268 bu.
Flour	16,044,077 bbl.	Pork (bulk)	51,147,004 lbs.[1]

The above statement refers to outward bound trade only, and includes merely a few of the main items of the canal traffic. It does not give any idea of the traffic between local points on the canals within the State. During this same period there cleared from the same terminals 585,014,816 pounds of merchandise bound inland. Thus the canals gave access to markets both within and outside the State. As compared with the rate of transportation by wagon, the charges by canal were not more than one-fifth as great. This meant a saving to the settlers on what they had to import as well as more income from the exports. For many regions of the interior the canals furnished the first incentive to produce a surplus for sale.

The canals stimulated industry, developed the great resources of the state, increased the value of land and property along their courses and invited new capital. Reference to the valuation of property on the tax lists, while not an accurate index of the real values at two different periods, still affords a basis for comparison. The total valuation in 1825 was fifty-nine and one-half millions, but in 1850 it had grown to four hundred and forty millions and showed an annual increment, from 1840 to 1850, of thirty millions. Extending our view to 1860 when the canals had served their greatest purpose, and comparing the thirty-seven canal counties with the fifty-one others, we find the valuation of the canal counties comprised about fifty-five per cent of the whole. If we compare the excess in wealth of these same counties

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[1] *History of the Ohio Canals*, (1905), p. 133. Published by the Ohio State Archæological and Historical Society.

at the opening of the canal period and in 1860 we find that the excess of the canal counties had increased over five-fold.[1] But many of the counties were so near the lines of communication as to reap almost equal benefits, so if we divide the counties on this basis into two equal groups of forty-four each, and compare them in the same manner as above, the canal and adjoining counties show a very much greater gain. Of course, individual counties show a still more striking result.[2]

In 1850, the population, stimulated by the opening of the canals and the growth of prosperity, had increased to almost two million. The average density of the whole state in 1840 was thirty-seven plus, while that of the twenty-nine counties then touched by the canals was forty-five. This difference between the canal and non-canal counties was more marked in 1850. During the period from 1830 to 1850, when the canals were in their prime, the population increased by 1,042,426, an increase greater than during any other twenty years in Ohio's history.

The inland city is at first a distributing center, collecting produce from and sending out merchandise to the surrounding community. Therefore, before such centers can attain any great importance the tributary country must be developed, and ways of communication must be established both with the interior and the outside world. As population increases the growing center must secure labor, capital and raw materials, to which must be added power by water, steam or electricity, if it is to become a manufacturing town. The canals in Ohio added greatly to the sources of motive power, and mills were built in great numbers along their banks. When the introduction of steam displaced water-power, to a large extent,

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[1] *Cf. History of the Ohio Canals*, pp. 122–124. [2] *Cf. ibid.*, pp. 124–125.

and facilitated the concentration of manufactures in centers with the best shipping facilities, it was still necessary to use the canals to transport the coal used for fuel to these towns, as well as to send out the products. In 1830, at the opening of the canal period, Cincinnati was the only city with more than 3,000 population; but in 1850 the same towns, which had from 2,000 to 3,000 inhabitants in 1830, had from 3,000 to 18,000. Of the twenty-two largest towns of the State, fourteen were on canals, four on the Lake, and four on the Ohio River. The interior towns had grown up largely along the canals at places where products were to be shipped or commodities distributed; where storage houses were to be built and markets established. In these centers laborers were employed in greater numbers, and if power and raw materials could be had manufacturing also soon developed.

The largest cities in the United States are located on sea-coast, lake or river. Of these Ohio has two, Cleveland on Lake Erie and Cincinnati on the Ohio. The latter city had from the first taken the lead in the Ohio valley because of its location. Situated midway between the Alleghenies and the Mississippi river, and on the border between North and South, at the junction of canal and river, with 1000 miles of the best turnpikes in the State converging upon it, in close proximity to the grain and live-stock produced in the rich Miami valley, the city was destined to become a trading and manufacturing center of the first importance.

In 1848, 500,000 hogs were packed in the city and the products, valued at about eight millions, were distributed over the Mississippi valley. The name Porkopolis was sometimes applied to the city because of these extensive packing interests. In 1850 the total value of iron products was about six millions. In 1851 the city em-

ployed 30,000 men in all branches of its manufacturing, turning out a product valued at fifty-three and a-half millions. At the same time its wholesale and retail trade in dry-goods, groceries, hardware, iron, crockery, glass, *etc.*, amounted to thirty-six millions. Its receipts by river, canal and railroad in 1847 were valued at fifty-one millions, while its exports amounted to almost fifty-six millions. Much of the city's trade was with the South, so that when the struggle over slavery became more intense, Cincinnati's financial interests were on the side of harmony and compromise.

In 1850 Cincinnati had 115,000 population drawn from all parts of the United States and many parts of Europe. Her only rival in the West was New Orleans. There were 30,799 persons living in the county who had been born in other states of the Union. Of the European immigrants who had arrived in Ohio before 1850, Hamilton county had received almost one-third. They came to work in the shops or packing industries because here were the busiest center and the highest wages.

Thus had the State developed its material resources during the first half-century. The settler was gradually acquiring control over nature. The harsh struggle with the environment had created a vigorous and independent type which had already asserted its superiority in business enterprise and shown political influence in the councils of the Nation. Men were accumulating a surplus of wealth to be devoted to better ways of doing things and to the development of other activities than those of simply making a livelihood, as the early pioneer had done. The environment emphasized the qualities already well-developed in most of the settlers coming into Ohio and helped to produce men of action, individual resource and initiative, great soldiers, great statesmen and captains of industry.

CHAPTER II

SOURCES OF OHIO'S POPULATION BEFORE 1850

IN discussing the settlement of the Northwest Territory perhaps too much importance has been given by local historians to particular places, for instance to Marietta and Cleveland, whose founders came from New England, and to Cincinnati, which was settled from New Jersey and Kentucky. The settlement of Ohio was a part of the westward movement of population seeking more freedom or better economic opportunity. Settlers came from several different states with varied ideals and traditions.

At the close of the 18th century the western border extended southward from western New England through New York, Pennsylvania, Virginia and the Carolinas. It was difficult to cross the ranges from east to west, but comparatively easy to follow the valleys of the ranges running north and south. The backwoods people had opportunity to become a physical and cultural type distinct from the people of the coast regions and extending across political boundaries.[1]

The trend of the valleys guided many of the early inhabitants of Pennsylvania to the back-country of the South. Throughout this whole region many were of the same blood and most were endowed with the same fearless spirit and sturdy independence. Calhoun's grandparents lived in Pennsylvania, and there also Daniel

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[1] *Cf.* Ellen Churchill Semple, *American History and its Geographical Conditions*, p. 62.

Boone spent a part of his youth. Thence he moved to North Carolina and afterwards opened up the way over the "Wilderness Road" to Kentucky. This is typical of the route that many followed into Kentucky and the Northwest Territory. Western Virginia, including Kentucky, had 190,000 population when the settlers came to found Marietta in Ohio.

The Scotch-Irish.—Driven by intolerable oppression and animated with the desire for better opportunity, the Scotch-Irish crossed the ocean in great numbers during the 18th century. In 1718 several hundred came to Boston but were not permitted to remain. Some of them attempted to erect a church at Worcester, Massachusetts, but the Puritans destroyed it. The intolerance of the coast regions from the first forced them to the frontiers where they formed a barrier against the Indians. Many went to New York, New Jersey and the South, but the greatest numbers sought Pennsylvania, because there they hoped not only for economic freedom, but for personal and religious freedom as well. Logan, the Secretary of the Province, in 1724 described them as having occupied the southern part of the state towards the Maryland line, and called them "bold and indigent strangers." Five years later the Secretary expressed the fear that "if they continue to come they will make themselves proprietors of the province." In 1730 he again speaks of them, this time complaining that they had taken possession of 15,000 acres of land reserved for the Penns, alleging as they took possession that "it was against the laws of God and nature that so much land should be idle while so many Christians wanted it to labor on."[1] Here was exhibited the

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[1] Charles A. Hanna, *Historical Collections of Harrison County* (1900), pp. 15-16.

spirit of democratic equality and opposition to aristocracy, especially landed aristocracy, with which they had had such bitter experience. The Whiskey Rebellion in Pennsylvania was no doubt in part at least a Scotch-Irish protest against government interference and an expression of native independence and desire for self-government.

In 1750 the population of Virginia was reported as "growing every day more numerous by the migration [*sic*] of the Irish who, not succeeding so well in Pennsylvania as the Germans, sell their lands in the province and take up new ground." [1]

In 1785 the Scotch Presbyterians in Virginia entered heartily into the reforms sought by Jefferson. They signed a petition of 10,000 names to aid in securing a bill granting religious freedom. Having been oppressed by a religious aristocracy as well as by the landlord, they hated such power in the hands of one man or a class. The descendants of these men passed on westward as the frontier extended, and in the early nineteenth century kept up the struggle for individual liberty until in the Middle West the great democratic movement led by Andrew Jackson secured recognition in the political life of the Nation.

At the close of the Revolution the Scotch-Irish were entering southwestern Pennsylvania in large numbers and in 1790 the population of the four counties in this part of the state was 63,000, a large majority of whom were Scotch-Irish.[2] Thousands had moved on by land or river into Kentucky before the Northwest Territory was open for settlement.

[1] Francis A. Walker, "The First Century of the Republic," *Harper's Monthly Magazine*, vol. li, p. 410.

[2] *Cf.* Charles A. Hanna, *op. cit.*, p. 21.

Ten years before Marietta was founded by the New Englanders, the enterprising pioneers of western Pennsylvania and Virginia crossed the River and established settlements. In 1785 there were more people living in Ohio than formed the first permanent colony in 1788. They were driven off and their cabins destroyed by United States troops because they were trespassers. They banded together to resist this interference on the part of the government but, on a grant of a few days' time, retired peaceably, to return later when the region was formally opened for settlement.[1] This illustrates very well how this restless, pioneer people was always found in the advance of the westward movement.

Early in the nineteenth century the slave-holding aristocracy of the coast regions of the South began to dominate the back-country population and to extend the system of slave labor farther to the West. The farming class of the interior began to be displaced by the planter. Many small farmers preferred to avoid the competition with slave labor so they moved on into Kentucky and then across the Ohio River. It was, then, the poorer, more democratic, non-slaveholding class of the South which furnished the bulk of the southern settlers north of the Ohio river. Many of them were strongly opposed to slavery and all were interested in bettering their own economic condition.[2]

The influence of this Scotch-Irish stock in southern Ohio was very marked. They brought with them their religion; they asserted their ideas of individual freedom and economic independence, and they supported the political principles of Jefferson and the rising democracy.

[1] *Cf.* Hanna, *op. cit.*, pp. 43-53 for details.

[2] *Cf.* Frederick J. Turner, *Rise of the New West* (1906), pp. 54 and 77.

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Mr. Hanna publishes a letter, dated Feb. 14, 1813, from Walter B. Beebe, a young lawyer of Harrison county in the southeastern part of the State, to his parents in Massachusetts, in which he describes the people of his own and adjoining counties as having come largely from Virginia and Pennsylvania. They were mainly Germans and Scotch-Irish and were "more litigious and quarrelsome than Yankees." [1]

Very many of Ohio's prominent statesmen, soldiers, jurists, clergymen, educators and men of affairs in the early days of the State's history belonged to this stock, and as a whole the Scotch-Irish played an important part in transforming the wilderness and creating a new commonwealth.[2]

The Germans.—German immigration into Pennsylvania began in the latter part of the 17th century. During the first quarter of the 18th century larger numbers were forced to flee from the states along the Rhine. They sought refuge in Pennsylvania, where they were promised religious and economic freedom. It is estimated by Proud in his history of the state that in 1776 the Germans and Swiss formed about one-third of the population of Pennsylvania,[3] Even as early as 1726, Logan, the Secretary of the Province, wrote, "We shall soon have a German colony, so many thousands of Palatines are already in the country." [4]

They sought the free land as the Scotch-Irish had done. They too had experienced the hand of oppression and were seeking individual freedom in religion and

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[1] *Cf.* Hanna, *op. cit.*, pp. 107–108.

[2] *Cf.* Hanna, *op. cit.*, p. 3 for list of names of these men.

[3] *History of Pennsylvania* (1798), vol. ii, p. 273. Also *cf.* Hanna, *op. cit.*, pp. 34–37 for numbers.

[4] Francis A. Walker, *op. cit.*, p. 410.

government. They were industrious, thrifty and intelligent. Following the valleys towards the south, they entered Maryland, western Virginia and Kentucky in large numbers. They mingled with the Scotch-Irish to form the pioneer back-country population, from which the early westward streams of migration were rising. Many of them passed from Pennsylvania into Ohio, settling the central and eastern counties where they contributed much to the material prosperity of the State by their thrift and industry. Many came to Cincinnati also because of the industrial opportunities there. They brought their religious beliefs and social traditions along with them. They were fitting material from which to develop a western democratic society.

The Quakers.—The Puritan intolerance displayed itself during the seventeenth century in the treatment of the Quakers. This was followed by the founding of the Quaker colony in Pennsylvania in 1681, where those who had been spurned in New England found refuge.

The Quakers in Virginia and the Carolinas fared little better. Zealous for religious freedom, they took the lead in the struggle for toleration during the first half the eighteenth century, as the Presbyterians did in the second half. They had already become the largest organized body of Dissenters in these southern colonies. They were persecuted in Virginia and disfranchised in the Carolinas. They began the fight which Jefferson carried to a successful conclusion in 1776. In North Carolina this sect struggled not only for religious but also for political rights.[1]

The Quakers early protested against slavery in the

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[1] *Cf.* Stephen B. Weeks, *Southern Quakers and Slavery, Johns Hopkins University Studies in Historical and Political Science*, extra vol. xv, pp. 145-170.

South, freed their own slaves and sought to persuade others to do the same. Soon after 1800 this protest took the form of migration toward the free soil of the Northwest. These men formed the middle and lower ranks of society and had owned few slaves at any time. Many for economic reasons accompanied the Quakers on their westward migration. The mother of Edwin Stanton came from Virginia to Ohio with a Quaker family.[1] Quakers left the South by hundreds, coming from Virginia direct to Ohio and from the Carolinas by way of Kentucky into the region north of the Ohio River. Many came first to western Pennsylvania and later into Ohio. Some Meetings in Virginia were so depleted by migration as to be given up altogether, and in 1800 one entire Meeting migrated from Jones county in North Carolina to the Concord Monthly Meeting in Ohio. In the latter case they gave slavery and oppression as reasons for their coming.[2] In 1805, it is estimated, not less than 800 families of Quakers from these regions had migrated to Ohio.[3]

Weeks attempts to summarize the results of his investigations as to the movement of Quakers from the South before 1860. His figures, however, do not include women and children, but stand for only the heads of families, or single persons who took certificates from their home to the new country in the West. Many went without certificates to places where there was no Quaker Meeting, and many of the records were imperfect or inaccessible, so that the figures he gives are much below the actual numbers. Nevertheless, his summary

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[1] *Cf.* Weeks, *op. cit.*, p. 280, footnote.

[2] *Cf. ibid.*, pp. 256–259. See letter by Borden Stanton.

[3] *Ibid.*, p. 249.

does show that a large number of Quakers came to Ohio from Virginia during the early years of the last century, and a smaller number from the Carolinas.[1] The records of the Miami Monthly Meeting in Ohio showed that about 1200 were received by certificate during 1804–1806 from Virginia, the Carolinas, Georgia and Tennessee. The chief centers in the State were at Concord, Miami, Short Creek, Stillwater, Springborough, Plainfield, Fairfield, Center and Salem. As early as 1801 the governor, in his annual message to the legislature, noted the fact that many Quakers had lately come to the State and characterized them as industrious, sober and moral people, a valuable acquisition to any country. On his recommendation they were allowed to pay a money equivalent for military service in the militia.[2] During the struggle over slavery they were found on the side of the slave. To him they were ready to render practical aid in his attempts to escape from his master.

Influence of Early Military Expeditions. One of the most important influences in directing attention toward the Ohio country and in spreading more definite information about it among the border population was the constant need, during the latter part of the eighteenth century, for sending expeditions into the region beyond the Ohio to repel the hostile Indian attacks against the frontier settlements. In the early days the power to hold the new country came from the sturdy and fearless backwoodsmen of western Pennsylvania, Virginia and Kentucky. Before 1780 these expeditions, crossing the Ohio time after time, had succeeded in driving the red

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[1] *Cf.* Weeks, *op. cit.*, pp. 269–270. Table of certificates issued and received.

[2] *Cf.* Jacob Burnet, *Notes on Northwestern Territory* (1847), p. 328.

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men from eastern and southern Ohio back to the headwaters of the Scioto and Miami. The savage looked with jealous eye upon the advance of the whites and lost no chance to strike a deadly blow at his enemy. In the days of the Revolution, Colonel Clark with the help of his trusty pioneer followers from Virginia and Kentucky held this western country for the New Republic.

Marietta and Cincinnati both grew up under the protection of a fortress. More aggressive action soon became necessary as the settlers pushed on into the interior of the state. So in 1789–90 General Harmar collected troops at Cincinnati and, cutting his way through forests, advanced against the Indians as far as the headwaters of the Miami where he burned their crops and scattered their villages. But he simply angered without subduing them. Another expedition was necessary and St. Clair set out the next year from Cincinnati with a body of men largely recruited from the frontier. His object was to establish a line of forts to the Maumee as a matter of self-defense. He had erected Forts Hamilton, St. Clair and Jefferson on his advance when he met with complete defeat at the hands of the Indians, and his retreating army left the route open for the renewed attacks of the now emboldened foe. It remained for Anthony Wayne, himself a Scotch-Irish Pennsylvanian, with his well-organized frontier army, to accomplish what St. Clair had failed to do. Through him was secured the peace of Greenville in 1794, and thereafter the settlers were comparatively free from attacks.

Duncan MacArthur, who later became governor of Ohio, was a lieutenant under Wayne in 1794. He was Scotch-Irish, of the same blood later used so effectively by Jackson at the battle of New Orleans. It is evident from the records of county histories that

many of the men engaged in these expeditions, having received a favorable impression of the opportunities offered in the new country, came afterwards to settle permanently in Ohio. Such a man was John Riley, born in North Carolina, but active in all these frontier struggles. He moved into Kentucky, and then into Ohio, becoming a member of Ohio's first constitutional convention in 1802.[1] Colonel John McDonald, a typical settler of Ross county, spent his early life on the frontiers of Pennsylvania, Virginia and Kentucky and served as a scout under Wayne in 1794. He was one of the "squatter settlers" in Ohio in 1785 and when driven out went to Kentucky, and later came north into the Virginia Military District of Ohio.[2]

It must not be forgotten in this connection that Virginia had reserved a large tract in Ohio especially to reward her veterans who had served in the struggle for Independence and exhausted their fortunes in the cause of liberty. The War of 1812 also caused bodies of troops from Pennsylvania and the South to pass to and fro over Ohio soil, thus making men from outside the State more familiar with its resources. Many of them, after the war, returned to Ohio to found permanent homes within the State. The great westward movement had then begun in earnest.

Statistics. Official census figures relating to the population coming into Ohio from Pennsylvania and the South were not taken until 1850, at the very close of the period we are considering. In this year the inhabitants born in other states but living in Ohio were tabulated

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[1] *Cf.* Burnet, *op. cit.*, pp. 469–478. *Cf.* James McBride, *Pioneer Biography*, 2 vols., Cincinnati (1869). Other examples.

[2] *Cf.* Isaac Finley and Rufus Putnam, *Pioneer Record of Ross County*, pp. 47–52. See other examples also.

and they present an interesting study. Pennsylvania had furnished over 200,000, more than twice as many as any other state and several times as many as all New England together. Taking the seven states which furnished the largest numbers, we find that, out of a total of a little less than a half-million from these states, Pennsylvania furnished forty-three per cent; Virginia eighteen per cent; New York seventeen per cent; Maryland eight per cent; New Jersey five per cent; Connecticut five per cent; and Massachusetts four per cent.[1] It will be observed from these percentages that Massachusetts and Connecticut together furnished just half as many as Virginia and about one-fifth as many as Pennsylvania.

The lines of migration were still converging from the eastern and southern states upon the fertile Ohio Valley. The total population in the State at this period was a little less than two million, so that by far the larger number had been born on Ohio soil. Very many of the first settlers had died before the census of 1850, leaving children as natives of Ohio but influenced by the ideas and traditions of their fathers. An even larger percentage of these could trace their ancestry to Pennsylvania and the South in the previous generation. It is therefore evident that the figures are not an accurate index of the relative proportions of the very early settlers from the various older states. There are other sources of information on this point but, before we pass to an examination of them, another significant fact is revealed by the census figures already before us. They show that during the twenty-year period before 1850 Virginia had increased only about seventeen per cent in population, New York

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[1] Figures used as basis found in United States Census for 1850, table xv. These seven states furnished about eighty-seven per cent of all those born in other states, but living in Ohio in 1850.

sixty-one per cent, Pennsylvania seventy-one per cent, while Ohio had increased one hundred and ten per cent.[1] Of course there were various reasons why population should not increase so rapidly in Virginia. Chief among them was her system of slavery, but certainly the next great cause, and one due in part to this very slave system, was the migration toward the West and Northwest. During the period, New York and Pennsylvania were receiving great additions of foreign immigrants to swell their natural increase; consequently the fact that they were pouring a constant stream of people into Ohio and the West did not decrease their percentage of increase so much. Ohio's rapid relative increase shows the state to have been the meeting place of the population from many states.

In 1850 there were about a quarter of a million persons from outside the United States living in Ohio, of which Hamilton county with Cincinnati had almost one-third. These were chiefly German and Irish.

The other available sources must now be examined to determine, if possible, whence came the earliest settlers of the State, and in what proportions from the different states. It is necessary to remember here that the westward movement along parallels of latitude did not begin on a large scale until after the War of 1812. The northern route was not free until that war was over, and indeed until the Erie Canal was opened and lake traffic began to develop on a large scale. With the coming of

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[1] *Cf. Twelfth Census, Population*, pt. i, table vii. Gives the bases from which the percentages are calculated.

	1830.	*1850.*
Ohio	937,903	1,980,329
Pennsylvania	1,348,233	2,311,786
Virginia	1,211,405	1,421,661
New York	1,918,608	3,097,394

the steamboat and a system of canals, the prosperity of northern Ohio, which had developed slowly up to this time (1825), was assured. As a result of the lack of early means of communication by the Lake route, persons coming westward often moved into Pennsylvania or New York from New England, and after a generation moved onward. In contrast, the direct route through Pennsylvania and that by way of the Wilderness Road were early open to the westward-moving population.

County historians have made attempts to gather information as to the sources of the early settlers in each county and the records of land entries furnish some valuable information. It is suggestive to tabulate the results found in the collections of Mr. Howe, corrected and supplemented by other separate county histories.[1] Taking the very early pioneers of each county as divided in 1847, when the number of counties was eighty-three, it appears that Pennsylvania was represented among these earliest settlers in forty-one per cent of the counties; Virginia in twenty-seven per cent; all New England in twenty-four per cent; Kentucky in eighteen per cent; New Jersey in seven per cent, and Maryland in six per cent. These percentages are incomplete and subject to a large degree of error, but they are suggestive as additional evidence of the early preponderance of Pennsylvania and southern populations on Ohio soil.

In his "Historical Collections of Coshocton County," William E. Hunt claims to have discovered a change in the character of the incoming population about 1830. He says[2] that before that date most of the people came

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[1] *Cf.* Henry Howe, *Historical Collections of Ohio*, Centennial Edition (1890), 3 volumes. See also earlier edition in one volume published in 1847.

[2] *Cf.* p. 20.

to this county, which is a little south of the central part of the state, from Maryland, Virginia and Pennsylvania; but after 1830 the increasing population from outside came from New York, western Pennsylvania, Germany and Ireland. He attributes the change largely to the canal system and the opening of the northern route of migration. This is also evidence that the very early settlers came from Pennsylvania and the South in greater numbers than the census for 1850 would indicate.

The nativity of members of the legislature of Ohio at different periods also throws some light on the problem of the relative numbers of settlers from the various states. Of course it may be objected that the number of legislators who were natives of a particular state is not an accurate index of the number of settlers at the given time from that state. This may be admitted and yet, when this evidence is placed with the results from the other sources of information already cited, it may be of considerable importance. At least this evidence will show whence came the men who guided the policies of the new state.

Our information as to birth-places of legislators does not extend earlier than 1820, but after that date the percentages were as follows: [1]

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[1] The figures for the calculation of the percentages in the table were obtained from the following sources in the order of dates given in the table: *Niles Weekly Register*, vol. xxi, p. 368; vol. xxv, p. 261; vol. xxx, p. 32; vol. xxxv, p. 366; *Ohio State Journal*, January 1, 1836; *Niles Register*, vol. lvii, p. 403. The total membership of the legislature was obtained from *The Ohio Hundred Year Book* (1901), by E. H. Gilkey. Legislators born in Ohio are not included in the table, and after 1840 more were born in the state than in any other single state. The percentages of the fourth column are presented separately because this is the region we have been especially interested in. The three separate states are represented because they are the chief representatives of the three groups of states considered. The numbers denote per cent of the total membership (both houses).

YEAR.	Middle States, *i. e.*, Pa., N. Y., N. J. and Del.	Southern States.	New England.	Pa., N. J., and South.	Pa. alone.	Va. alone.	Conn. alone.
	%	%	%	%	%	%	%
1821–2	37	32	25	66	26	18	13
1823–4	48	27	21	68	28	16	10
1825–6	43	25	25	61	30	20	11
1828–9	50	20	25	61	37	13	14
1835–6	40	31	16	63	28	20	—
1839–40................	40	19	9	52	28	13	8

These percentages show that the greatest number of legislators, born in other states, was furnished at each period by the Middle States. Among these, Pennsylvania was by far the most important single state during the whole period, herself contributing over one-fourth of the whole membership of the legislature and at one period a third.

The southern States furnished the next largest number. Among these Virginia stood easily first, contributing a larger number during the later years of the period than all New England and during the entire period more than any other state except Pennsylvania.

Among the New England States, Connecticut contributed most because her Western Reserve attracted many of her citizens to this region. When we combine Pennsylvania, New Jersey and the Southern States, the proportion during the first decade reached almost two-thirds

of the entire legislature, and during the second decade the proportion was only decreased by the fact that more of the legislators were natives of Ohio soil, the proportion relative to other states being even greater.

In the period 1835–1845 the Southern States maintain their proportion or increase it whereas the New England members fall off about half. This was the period of the anti-abolition struggle and the decrease in New England members may be due, in some measure at least, to the strong anti-slavery views of the New England people in Ohio and their exclusion from the legislature on this issue. The same influence probably increased the number of members of southern birth.

The birth-places of fifteen out of sixteen United States Senators from Ohio prior to 1840 show that six, or forty per cent, came from Virginia; four, or twenty-seven per cent, from Connecticut and that Ohio, Pennsylvania, Kentucky, New Jersey and North Carolina each furnished one. If we combine Pennsylvania, New Jersey and the South, as in the case of the state legislators, the percentage is sixty-six and two-thirds, or ten out of fifteen. These Senators came from the southern counties of Ohio where lived the greater part of the southern population, and were elected by legislators the majority of whom came, as we have seen, from Pennsylvania and the South.[1]

Before 1840, seventy-five United States Representatives had been elected to Congress from the various Ohio districts. Of these, the birth-places of sixty-two are recorded.[2]

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[1] Senators from Brown, Washington, Ross, Warren, Belmont, Highland, Hamilton, Fairfield, Clermont. *Cf.* Gilkey, *op. cit.*, pp. 574–575.

[2] The chief source for birth-places of both Senators and Representatives has been *The Biographical Congressional Directory, 1774–1903*, compiled by O. M. Enyart, Washington, 1903, United States Fifty-seventh Congress, Second Session, House Document 458, vol. 100, 4539.

Of these sixty-two, New England contributed twenty-one per cent; the South twenty-four per cent; the Middle States forty-eight per cent; and combining Pennsylvania, New Jersey and the South as before, the aggregate for these regions was sixty-three per cent. These percentages correspond in a general way with the results arrived at in reference to the nativity of the state legislators. The Middle States in both cases contributed by far the greatest number, Pennsylvania taking the lead. The Southern States came next in both state and national legislature. Evidently the State's influence in national affairs was in the hands of men, the majority of whom had been born in Pennsylvania and the South.

From all the evidence presented it seems clear that Ohio's early population came largely from the back-country regions of Pennsylvania and the South. It seems highly probable that the largest single element was the Scotch-Irish, who, although they came from several of the older states, were in many respects of the same type, democratic, impatient of restraint, energetic, self-reliant and practical. Theirs were the ideas characteristic of the frontier. Germans, also from Pennsylvania, settled in the counties of the east-central and central parts of the State, and formed a large proportion of Cincinnati's population. The Puritans from New England and the Cavaliers from the coast regions of the South were present in considerable numbers.

In spite of the diversity of populations and ideas meeting and mingling on the Ohio frontier, there was a measure of unity in purposes, beliefs and ideals which had brought the settlers away from the older societies to the borders of civilization.

CHAPTER III

DEMOCRACY AND INDIVIDUALISM TRIUMPHANT OVER FEDERALIST IDEAS.

"The ideal of the West was its emphasis upon the worth and possibilities of the common man, its belief in the right of every man to rise to the full measure of his own nature under conditions of social mobility."[1]

The Territorial Stage of Ohio's Government.—In the Northwest Territory each settler could start on a footing of essential equality to win or lose in the struggle with his environment. After the Ohio country was freed from the dangers of Indian cruelty, each according to his choice plunged into the interior. The common object was to subdue the wilderness, but lack of ways of communication made common action over a wide area out of the question, and each community-group or family isolated from other groups became as nearly self-sufficing as possible. 2

When Columbus was founded in 1798 there was no grist-mill nearer than Chillicothe, forty-five miles to the south, and for eight years this was also the nearest post-office. Such conditions were calculated to bring out all the individual resourcefulness at the command of the new settlers. Each family or local group must provide the necessaries of life for itself. Each little group became democratic. It mattered little what had been the rank before, social equality was the rule of the frontier.

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[1] Frederick J. Turner, *Rise of the New West*, pp. 68–69.

When goods came by pack-horse from Detroit or by wagon from the East, and common cotton check sold for one dollar per yard, all dressed much alike, not from choice, perhaps, but from necessity. In most of these early groups there were no aristocratic lines.

Even amusements proceeded from matters of necessity. All participants came from far and near to raise the log cabin of a settler amid the forests. After the work of the day the young people spent the night in merriment and dancing, while the older folk told stories and chatted beside the blazing fire. In autumn the pile of corn invited the attack of ready hands to win the prize of the "husking bee." A wedding also was a public event in which the whole community was interested. A favorite amusement on the Hamilton Common was the racing contests where all classes assembled from the country round to enjoy the pleasure and incidentally to transact matters of business.

William Maxwell founded the first newspaper at Cincinnati in 1793. But the early news items were largely statements from the outside world, and served little purpose in unifying state opinion. Sometimes four weeks passed with no mail from outside, and often the local news failed to appear for want of paper on which to print it.

These facts make it evident that the early conditions of settlement were such as to bring out the individual initiative and resource of the settlers; and they also show that whatever community-feeling had been developed was almost entirely local.

Nathaniel Massie became the leader among those who first settled the Virginia Military District in southern Ohio, a tract of more than four million acres of excellent agricultural land. After the Revolution, at the age of

twenty, he came to Kentucky from Virginia to seek his fortune, and soon became an expert surveyor as well as a successful business man. Kentucky was then a center of democratic ideas. The people cared little for the national government and were eager to become an independent commonwealth. They fretted constantly under restraint. Jefferson was the guiding spirit of these men, the friend of the West. The spirit of individual liberty and opposition to a paternal control was in the air among the people moving into the Northwest Territory.

After 1790 the land between the Scioto and Miami rivers was parceled out to Virginia's war veterans. It was not protected, as Cincinnati and Marietta had been, by the federal forts. The Virginians erected their own block-houses and defended themselves against the dangers of Indian attacks. Only men of strong and self-reliant stamp were fit to endure the hardships of such a life.

Massie established the first settlement in this district, and the fourth in the State, at Manchester, north of the Ohio, in 1790. This little community at first had no civil officers but expelled a troublesome person summarily when it could tolerate his presence no longer. Its people had confidence in themselves and were perfect democrats.[1]

Another settlement far up the Scioto, at Chillicothe, was founded six years later. Soon one hundred pioneers from Virginia and Kentucky, intent on bettering their fortunes, braved the dangers of pushing on into the interior. The land was sold to the settlers by Massie in small tracts at low prices, or apportioned by the Virginia government as a reward for previous military ser-

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[1] *Cf.* David M. Massie, *Life of Nathaniel Massie* (1896), p. 57.

vice. Around Chillicothe as a center of Virginia settlers gathered some of the noted men of Ohio's early history, such men as Tiffin the first governor, McArthur a later governor, Worthington a United States Senator from Ohio, and Baldwin speaker of the lower house of the legislature. Over this Virginia district were soon scattered the claims of many southern settlers.[1] There was no regularity of survey, each settler having the privilege of locating his own claim.

When Adams county in this district had been erected, the Governor himself fixed the seat of justice at Adamsville while Massie desired it to be at Manchester, the original settlement of the county. As a result of this controversy the magistrates held court where they pleased and were reprimanded by the Governor. The right of the Governor of the territory to fix the seat of justice became a matter of bitter controversy later between the executive and the territorial legislature. It really shows the beginnings of party divisions in Ohio, for the issue in this case was as to whether the people of a locality should have the deciding voice in local matters, or be controlled by a Governor who derived his powers from outside the territory, was responsible to no one within, and could disregard public sentiment at pleasure. The Governor represented the latter idea; Massie and his southern associates represented the other. These early settlers were not friendly to the centralized government idea. Theirs was the spirit of the Kentucky and Virginia Resolutions in reference to the Alien and Sedition laws. The genius of the pioneer in Ohio was not in accord with the government provided under the Ordinance of 1787.

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[1] For method of securing these claims and the method of surveys, *cf.* Massie, *op. cit.*, chapters ii and iii.

Arthur St. Clair, a Federalist, had been appointed Governor. He was a gentleman of the old school and did not trust the common people in governmental affairs. The local officers were appointed by the Governor under the Ordinance. The executive was given also partial legislative powers and for years, with the three judges, constituted the only legislature that existed. An examination of these early laws shows that most of them were adopted from the code of Pennsylvania and a few from the codes of Virginia and Kentucky.[1]

The Governor claimed the right also to create offices which he deemed necessary and to fill them, to grant licenses to taverns and ferries and to fix the seats of justice in the various localities marked out into new counties. This method of governing was essentially aristocratic and therefore distasteful to the followers of Jefferson. Hinsdale says concerning these people, "The political temper of western society, even north of the Ohio, was far more like that of the South than that of New England."[2]

There were certain significant contrasts within the Territory during these early days between the ideas and practice of the New Englanders and of those settlers who came from the frontiers of Pennsylvania and the South. In the Miami settlement, before the territorial courts had been established, the people assembled to consult and devise a plan for common safety. They chose a chairman and secretary, adopted a code of by-laws, prescribed certain punishments, organized a temporary court and jury, and appointed a judge and sheriff. When the first robbery occurred, the offender was

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[1] *Cf.* S. P. Chase, *Statutes of Ohio*, 3 vols. (1833), vol. i, pp. 92–210.

[2] *The Old Northwest* (1899), p. 295.

arrested, tried and punished with twenty-nine lashes the same afternoon.[1] This is exactly similar to the method used in southeastern Ohio by the "squatter settlers" before the territory was organized.

At Marietta among the New England settlers, before St. Clair and the judges arrived, the directors and agents of the Ohio Company met in July, 1788, to appoint a board of police, composed of the directors themselves, for the purpose of drafting a set of rules for the conduct of the settlement. The rules were made by this board and posted.[2] The New England settlement was from the start more of an organized unit with less of the individual initiative. It was managed as a stock company under a board of directors who prescribed the rules and regulations of the settlement.

The difference is further emphasized by the elaborate ceremonies at the inauguration of the first Common Pleas court in the territory. It convened September 2, 1788, at Marietta. The procession of judges, officers of the army and people was headed by the sheriff with drawn sword, and Governor St. Clair was present.[3] The early sessions of court in other parts of southern Ohio, especially in the Miami settlements, presented a marked contrast to this scene. It was usual to hold court in a cabin and not unusual to see the judge and jury seated under a tree, awarding justice.[4] The typical court of the West became a forum for training in debate and citizenship where the people attended in large numbers.

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[1] *Cf.* Jacob Burnet, *Notes on Northwest Territory*, p. 57.

[2] *Cf.* S. P. Hildreth, *Pioneer History* (Cincinnati, 1848), pp. 213-214.

[3] *Cf. ibid.*, p. 232.

[4] *Cf.* Caleb Atwater, *History of Ohio* (1838), p. 177.

A still more significant contrast between the New England settlement and the other settlements in southern Ohio consisted in the method of establishing them and the system of land-holding. The Ohio Company, whose first settlement was at Marietta, had been formed in the East with shares of $1,000 each. The articles of agreement laid down the general rules of conducting the company, limited the shares, and provided for five directors to be elected by the proprietors to whom were delegated extensive powers. The agreement also determined the method of assigning lots in order to secure equality, as well as the size of them and many details of their occupation, at the same time making provision that "foreigners of wealth and character might become proprietors" in the future.[1]

The company secured a large tract of land on the Muskingum river. The grant from Congress included a special provision for six hundred and forty acres in each township for the support of religion, and an equal amount for schools. This was due to the efforts of Dr. Cutler.[2]

This shows the idea of the New Englander that the social group as a whole was responsible for the maintenance of church and school. The directors arranged for the first expedition to the new settlement. All the details were put under the management of a superintendent appointed by the directors, who accompanied the settlers and remained on the ground. Everything was provided for, from the size of the lots of land and the building of houses and planting of the land, to the educational and religious instruction of the settlers. The

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[1] *Cf.* W. P. Cutler and Julia P. Cutler, *Life of Rev. Manasseh Cutler* (2 vols.), vol. i, pp. 181 *et seq.* for agreement.

[2] *Cf. ibid.*, p. 319 and p. 346.

group was a unit where individuality did not have so much chance to express itself.[1]

With the system described above, contrast the more independent spirit of the frontier population from Pennsylvania and the South, which came into Southern Ohio to take up alone, or in small groups, the land at their disposal. In their eyes the wilderness was not to be won by a group effort, as in the case of the New England colony, but by individual initiative, to which their border life and struggles had already accustomed them. Southeastern Ohio, the Virginia military tract, and the rich Miami country, north of the Symmes purchase, rapidly filled with the self-reliant, pioneer type of settler who settled upon the small holding of land to make it his own.

It had been the policy of the federal government to sell land in very large tracts as in the case of the Ohio Company's and Symmes' purchases in Ohio. But this large-tract plan was essentially undemocratic and unsuited to such a population as was entering the region north of the Ohio. It gave too much chance to the land speculator and too little opportunity to the individual settler. The national government therefore quickly abandoned the scheme and disposed of the public domain in smaller tracts. In 1800, when the party of Jefferson came into power, and W. H. Harrison, himself a Virginian, was Ohio's delegate in Congress, a new act was secured, largely through his influence, which permitted tracts of 320 acres to be purchased by individuals. Land offices were opened at Chillicothe, Marietta, Cincinnati and Steubenville, in Ohio. A rush for the small holdings followed and settlement was accelerated. The size of the tracts was soon further reduced to 160 acres

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[1] *Cf.* Hildreth, *op. cit.*, pp. 193–206.

and the price fixed at $2 per acre, with five years for payment. This plan was thoroughly democratic and permitted a multitude of people to become freeholders.

In 1799 there was enough population in the territory to organize a territorial legislature as provided in the original Ordinance. A council of five persons was appointed by President Adams from among ten persons chosen by the people's representatives. Now both council and governor were appointed by outside authority and neither was responsible directly to the people. To vote for a representative to the legislature, the voter must own a freehold of fifty acres within the territory, be a citizen and a resident in the district for two years. The representative, to be elected, must possess 200 acres of land within the district, and a member of the council must own 500 acres of land.[1]

The Governor's power was really strengthened, for he was given an absolute veto over acts of the legislature, was in fact a "branch of the legislature" as he himself expressed it.[2] He held the appointing power even of local justices throughout the territory. St. Clair still stubbornly maintained his right to erect new counties and establish the seats of justice even after the legislature was established. So it appears that the territorial government was still extremely aristocratic and out of harmony with the spirit of the people who were governed.

The first legislature was made up of men of no ordinary ability, largely irrespective of party lines.[3] Tiffin

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[1] *Cf.* William H. Smith, *The St. Clair Papers* (Cincinnati, 1882), 2 vols., vol. i, p. 208.

[2] *Ibid.*, vol. ii, p. 475.

[3] *Cf.* Jacob Burnet, *Notes on Northwest Territory*, pp. 289 *et seq.* for facts about members.

of Virginia, an ardent follower of Jefferson and later elected the first Governor of the State, was chosen speaker. On the committees appointed by him were to be found a number of southern men, friends of Jefferson.[1] In the conduct of the legislature itself there was evident the opposition to the existing order of government. They remonstrated with Congress against the unqualified veto of the Governor[2] and his exclusive right to erect new counties. They sought to abolish property qualifications for voting and office-holding and to extend the right of voting for members of the legislature to all white male citizens of twenty-one years of age, who had resided one year in the Territory and had paid a territorial or county tax.[3] This was a plea for manhood suffrage which soon became the persistent demand of the western democracy and was actually incorporated in the first Ohio constitution.

At the close of the first legislative session, a resolution was offered indorsing the policy of President Adams. The council, which had been appointed by the President, passed it without dissent, but in the House there were five votes against the resolution and eleven in favor.[4] Here was the division along the lines of the national parties. In general the New England men tended to the Federalist party, the Southern men to the Republican, and the rest were divided. There was much complaining

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[1] *Cf. St. Clair Papers, op. cit.*, vol. ii, pp. 447 *et seq.* for the proceedings of this session and the committees.

[2] Out of the thirty acts of the legislature, the governor vetoed eleven. Six of these related to the erection of counties, which right the governor claimed exclusively. *Cf.* S. P. Chase, *Statutes of Ohio*, vol. i, p. 29.

[3] *Cf.* Burnet, *op. cit.*, pp. 300–315.

[4] *Cf. St. Clair Papers, op. cit.*, vol. i, p. 213.

as to the centralization of governmental powers and discontent with the administration of St. Clair.

Before the meeting of the second session of the legislature in November, 1800, the Territory had been divided and Indiana became a separate territory with W. H. Harrison as its Governor. St. Clair had at first advocated a three-fold division, on the ground that the parts of the Northwest Territory must be kept for a long time in the territorial stage and if not divided it must soon become a state. His plan was to make an eastern division with Marietta as a center where Federalist ideas should control; a central division with Cincinnati as center, and the western division, Indiana. The Governor claimed that the people were not ready for statehood, having yet no fixed political principles. Besides, those most likely to lead in the movement for statehood were opposed to the national administration, and would be even more republican in principles than the leaders in Kentucky who had just passed the resolutions against the Alien and Sedition laws. St. Clair distrusted the motives of the advocates of statehood and pointed out that "almost all of them are Democrats," and that they expected to secure power and influence under the new state government.[1] But the pro-state men had sent their representative, Thomas Worthington, a Virginian and a loyal friend of Jefferson, to Philadelphia to advocate before Congress the division of the territory along the present boundaries and the location of the seat of government at Chillicothe, the chief center of Virginia settlers in Ohio. The division was so ordered by Congress.

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[1] *Cf. St. Clair Papers, op. cit.*, vol. ii, pp. 482-501 for the details of the above opinions of the governor.

Meanwhile the second session of the legislature opened in November, 1800, at Chillicothe. Resolutions were offered by Nathaniel Massie, asserting the right of the legislature to erect new counties. So again was opened the old quarrel with the governor, and much discussion and bitter feeling was aroused.

In 1801, when statehood seemed imminent for the Ohio division, St. Clair and his supporters tried again to urge upon Congress a division at the Scioto river, and by this means either prevent statehood for a long time or throw the eastern division into the hands of the Federalists. At this period the Governor in a letter to Senator Ross of Pennsylvania, named Worthington, Tiffin, Massie, Darlington and Baldwin as his enemies in the Territory.[1] These men were the leaders of the party of Jefferson, three of whom at least had come from Virginia. At this very time Baldwin and Worthington were at the seat of the national government urging Congress to pass the enabling act for a new state. Petitions were secured and the Chillicothe junto was aided by leaders over the southern part of the Territory in creating a demand for statehood.[2] It was urged that the existing government was hindering the progress of the territory and the inflow of capital and population. The advocates of statehood pointed out that the territorial régime was out of harmony with the character and interests of the settlers.

Meanwhile opposition became so bitter against the governor himself that during the meeting of the legislature, in December, 1801, he barely escaped the violence of a mob at the house where he was staying in Chillicothe.

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[1] *Cf. St. Clair Papers, op. cit.*, vol. ii, p. 557.

[2] *Cf. ibid.*, vol. i, p. 231.

The mob was dispersed without serious violence and the leaders were arrested, but the magistrate promptly dismissed them.[1]

Charges of a serious nature were now preferred against the Governor by his political enemies.[2] These charges were drawn up by Nathaniel Massie, who had first quarreled with St. Clair over his right to fix the seats of justice for a county, and were presented to President Jefferson by the "agent of the state party," Thomas Worthington.

Petitions kept pouring in upon Congress, until finally the national legislature rejected the idea of dividing the territory and passed the enabling act to form a state constitution. Worthington shrewdly secured in this act a provision marking out the electoral districts for the constitutional convention elections, the number of delegates for each, the qualifications for voting, and the time of the assembly. Congress declared in favor of manhood suffrage in the election of delegates to the Ohio constitutional convention, thereby sweeping away old property qualifications and recognizing the demands of the people living in the Territory.

The opposition party of the Territory at once claimed that these detailed specifications by Congress were an invasion of popular rights, because the territorial legislature was ignored, and the people were not asked to pass by vote on the question of statehood. It was claimed that the scheme was of purely political origin, since the Republicans desired the additional electoral votes of the new state in the next presidential election. But the fact of the matter seems to be that, although it

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[1] *Cf. St. Clair Papers*, *op. cit.*, vol. ii, pp. 555-556.

[2] *Cf. ibid.*, vol. ii, pp. 563-570 for statement and discussion.

may have been a political scheme, the plan really expressed the will of a large majority of the people of the Territory. It was the only way to get the issue of statehood squarely before the people, for, if left to the legislative initiative of the territorial legislature, the Governor, who opposed such action, could and would have effectively blocked all the efforts of the representatives of the people. Such was the power of the absolute veto. The debates on the enabling act bring out this view clearly.[1]

The debates also show that the southern members of the House were generally in favor of admission while New England opposed. The vote on the enabling act stood forty-seven yeas to twenty-nine nays. Virginia members gave fifteen yeas and one nay; Massachusetts was about equally divided with four yeas and five nays; but Connecticut stood solidly against admission. The fundamental opposition appeared in the votes of Virginia and Connecticut. The South furnished twenty-seven yeas, the Middle States fourteen, and New England six; while, of the twenty-nine nays, New England furnished fifteen.[2] So it might be urged that it was as much a political scheme of the Federalists to keep Ohio from statehood as of the Republicans to make her a state, and that the opposition was less justified because the Republicans were working in line with the wishes of a majority of the people of the territory. When the elected delegates met in the convention in November, 1802, and voted on the question of statehood, before beginning their deliberations, there was only one negative vote, that of Cutler of Marietta.

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[1] *Cf. Annals of Congress*, 1801-2, pp. 1105-1112.

[2] *Cf. ibid.*, 1801-2, pp. 1161-1162.

Jefferson himself has been accused by his enemies of promoting the scheme of statehood. Of course it was to his personal interest as well as to the interest of his party to secure Ohio in the ranks of the Republican states where it remained for the first twenty years of its history. It is known that he did commend the constitution, and his opinion of the territorial government in the Northwest is a matter of record in a letter dated Jan. 23, 1800, where he says, "Surely such a government as the first form prescribed for the territories is a despotic oligarchy without one rational object."[1] Jefferson's sympathy was with these western people whose guiding spirit he was, and if he promoted statehood, as he probably did, it was more in the interests of the people whom he trusted and to whom he wished to give the greatest opportunity to realize their best interests, than from any narrow political motive.

Governor St. Clair's address to the convention indicates his personal attitude toward the proper relation of the territorial government to the people governed. He said, "My feelings are those of a father who saw the day drawing nigh which was to send a son, over whose education he had long watched with varied emotions of parental affection, into a world where dangers awaited him at every step."[2] The speech shows how little he appreciated that fearless, independent spirit of the pioneers with which he had to deal. No paternal idea of government would ever satisfy such men, and what were the dangers of which the Governor speaks compared with those they had undergone! Because of criti-

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[1] H. A. Washington, *Jefferson's Complete Works* (N. Y., 1853), vol. iv, p. 315. Also Ford edition, vol. vii, p. 411.

[2] *Cf. St. Clair Papers, op. cit.*, vol. ii, p. 593.

cisms made in this same address, St. Clair was accused to President Jefferson of using intemperate and indecorous language concerning the Congress, and of showing a disorganizing spirit.[1] Jefferson at once removed him and left the duties of governor in the hands of the loyal Republican secretary, Charles Byrd.

Such an outcome was to be expected, for the real point at issue was the principle of government. The Jeffersonian party was right in believing that the people of the territory should be allowed to govern themselves. The attitude of the Federalists was narrow and blind.

The First Ohio Constitution.—The principle of the territorial government had been questioned. The leaders of the people alleged that the form was anti-Republican and that the citizens did not enjoy the rights of freemen. The governor, judges and council were not subject to popular control; the power of appointment to office, vested in the Governor and Congress, had been abused and was dangerous in principle; and finally the executive controlled the will of the representatives of the people by his veto.

The delegates elected to the convention met at Chillicothe, November 1, 1802. It was their purpose to remedy the supposed evils of the former system and to introduce a thoroughly democratic form of government in harmony with the ideas and needs of the people.

Of thirty-five members we have been able to trace the birthplaces of but twenty at most. Of these Virginia furnished nine; Connecticut three; Pennsylvania, Massachusetts and Kentucky each two; North Carolina and Maryland each one. Of course this is not satisfactory

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[1] *Cf. St. Clair Papers, op. cit.*, vol. i, pp. 244-246 for the correspondence relative to the accusation and removal.

for the whole convention, but among those traced the preponderance of Virginia is evident, along with Pennsylvania and the Southern States. This much is certain, that the convention was in complete control of the Chillicothe Republicans.[1] Edward Tiffin was chosen president of the convention. He had come to Ohio from Virginia in 1798, having early in life adopted the views of Jefferson. He was closely associated with the group of Virginia men, chief among whom were Nathaniel Massie and Thomas Worthington, who were the strongest advocates of statehood. Most of the delegates were in accord with the national administration.

A study of the committees appointed by Tiffin to report on the various articles of the new constitution shows clearly the control which the followers of Jefferson exercised over the proceedings and results of the convention. Each of the eight articles was assigned to such a committee. Cutler says in his letters that in the judiciary committee, of the sixteen members, eight were from Virginia, including the chairman.[2] Worthington was placed on six different committees, and of two he was chairman, *i. e.*, Militia, and Privileges and Elections; Morrow of Pennsylvania was chairman of the committee which prepared the article on Electors and Elections; while Massie, who had had the old quarrel with Governor St. Clair, headed the committee on Executive Powers.[3]

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[1] *Cf.* D. J. Ryan, "The First Constitution," *Ohio Archaeological and Historical Society Publications, Centennial Celebration, 1903*, p. 25. Mr. Ryan says that of the thirty-five members all but two came from the southern and southeastern part of the state. Men from Virginia, Kentucky and Pennsylvania dominated the convention.

[2] *Cf.* Julia Cutler, *Life and Times of Ephraim Cutler*, p. 70.

[3] *Cf. Ohio Archaeological and Historical Publications*, vol. v, pp. 80–132 for full proceedings of the convention, its committees, etc.

The evidence seems to show conclusively that the most important constitutional committees were controlled by the strongest Republicans.

Jacob Burnet, a Federalist, in his "Notes" reviews the character and ability of the delegates. Of the four men whom he chooses to mention, as especially worthy, from Hamilton county, three were from the South and one from Pennsylvania. He refers in terms of high praise to the three Virginians from Ross county, Massie, Worthington and Tiffin.[1]

A letter from Speaker Macon of the United States House of Representatives, a member from North Carolina, to Thomas Worthington, dated September 1, 1802, shows how southern views were being brought to bear upon the makers of the new constitution. He recommended appointments by the legislature, even to the election of governor by joint ballot, and a limited term for all officers. He favored representation by numbers, abolition of all property qualifications, and election of the militia officers by those subject to duty or by the under officers.[2] Speaker Macon was an intimate friend of Jefferson and frankly admits in this letter that the suggestions given indicate the changes he would desire in his own state constitution. As a matter of fact the Ohio convention actually adopted all these ideas except that of electing the Governor by joint ballot of the legislature.

The Constitution itself shows the effects of the bitter struggle against St. Clair and the principle of aristocratic control. In the first place, the Governor, although elected by the people for a two-year term, was so stripped of real power that Corwin, after being Governor a

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[1] *Cf.* pp. 350–369.

[2] *Cf. St. Clair Papers*, vol. ii, pp. 590–591.

week, said, "The reprieving of criminals and appointing notaries are the sole powers of the prerogative." The convention denied all veto power to the Governor.

On the other hand, the great share of power was now put into the hands of the legislature elected for a short term by the people. The idea of making the legislature supreme was characteristic of the Southern and Western states especially, at this period. The powers in Ohio extended to the appointment of the judges for a limited term of seven years, and all civil officers in immediate connection with the government. Thus the office-holders were always within the power of the legislature. The legislative department controlled and restricted the judicial, thus weakening the independence of the judges. How this concentration of power in the legislature worked out will receive attention in a following section. It was by no means always to the interest of the people at large or on broadly democratic lines.

The old property qualifications for voting and office-holding were abolished and manhood suffrage was introduced. The only qualification relating to property at all was the requirement that a voter pay a state or county tax, but the road tax was accepted in fulfilment of this requirement, so that practically every white male of twenty-one years, who had been a resident of the state for one year, and was residing in the voting district, was allowed to exercise the franchise. This radical democratic tendency was in marked contrast to the requirements of most of the states at this time, but in accord with the ideas of the more democratic population of Pennsylvania and Kentucky, and especially of the settlers moving onward into the Northwest from the older states.

The desire was clearly to make all agents in the government responsible to the people by giving the power

to the representatives of the people for a short term. This tendency gradually extended to the direct election by the people of more and more of their officers. Already in the Ohio constitution provision was made to elect directly the justices, the sheriff and the coroner, as well as the governor and both houses of the legislature. Burnet voiced the conservative distrust of the masses when he expressed the fear that popular elections would be dangerous in making the officers so elected subject to popular displeasure.[1]

A comparison of Ohio's constitution, adopted in 1802, with the constitutions of Pennsylvania and Kentucky, adopted respectively in 1790 and 1799, shows advances toward a more radical democratic view, although in its fundamental ideas and powers it is most in accord with these. The Ohio convention decided on a shorter term for the state senators, *i. e.*, two years instead of four years, as also for the governor, *i. e.*, two years instead of three and four years, as in Pennsylvania and Kentucky. The limited powers of the executive have already been pointed out for Ohio. In both the other constitutions the governor was given the right of controlling legislation by the veto, and greater freedom in the appointing power. In Pennsylvania the judges of the courts were appointed during good behavior by the governor, and in Kentucky for the same term, *i. e.*, good behavior, by the governor and senate, but in Ohio, as has been said, the joint ballot of the assembly appointed them, and that only for a limited term with full power of removal.

In Pennsylvania the local justices were appointed by the governor during good behavior, and in Kentucky by the governor and senate from among persons nominated

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[1] *Cf. Notes*, pp. 350–369.

by the local county court. In Ohio provision was made for their direct election by the electors of the townships. In Pennsylvania the sheriff and coroner were appointed by the governor for three years, but from persons chosen by the people at the regular county election; in Kentucky the governor appointed these officers for two years from persons nominated by the county court. In Ohio they were elected directly in each county for a two-year term. So we see in Pennsylvania and Kentucky a combination of the principles of election and appointment, but in Ohio the next step was taken and the principle of direct election was introduced.

The only essential difference between the qualifications for voters in the Ohio Constitution and those in the other constitutions mentioned, was the requirement of a shorter residence within both the state and district.

There is in the Ohio Constitution another significant extension of the elective principle. The captains and subalterns of the militia were to be elected by the persons in the respective districts who were subject to service. Majors and colonels were elected by the lower officers, while the chief commanding officers were appointed by joint ballot of the legislature, leaving only the adjutant-general to be appointed by the governor. In Pennsylvania these officers were appointed by the governor. It had been customary on the frontier when expeditions were organized against the Indians to allow the men to elect their leader. Preference was then given only to the one who had proved himself and shown the qualities of a natural leader.[1]

The method of amendment was about the same in the

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[1] *Cf. Archaeological and Historical Publications*, vol. vi, p. 151 for an instance of the election of a leader.

Ohio and Kentucky Constitutions, and the Ohio Bill of Rights was worded more nearly like that of Pennsylvania.[1]

Turner says that the frontier regions have always exercised a steady influence toward democracy.[2] In the West the struggle for the principles of democratic government first compelled recognition. Self-government was demanded as a right by the brave pioneers who had won the wilderness by their own efforts. Men stood on a plane of equality so far as opportunity was concerned. Here in the interior naturally developed manhood suffrage. The principles of Jefferson were well adapted to western life and ideas. Simplicity, economy in government, freedom of the individual, the right of self-government and equal opportunity, the great leader of democracy had advocated long before the West was settled by men who were impatient of the restraints of law, religion and morality in the older regions of the country. In the West there was no established order, everything was dynamic.

Further Developments of Democracy.—The new state government was organized under complete Republican control which continued for almost a quarter of a century.[3]

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[1] *Cf.* B. P. Poore, *The Federal and State Constitutions*, 2 vols. (1877), vol. i, pp. 657–668, for the Kentucky constitution of 1799. Also vol. ii, pp. 1548–1557 for the Pennsylvania constitution of 1790. From these documents the preceding comparisons and conclusions were drawn.

[2] *Cf.* "Contributions of the West to American Democracy," *Atlantic Monthly*, vol. xci, pp. 83–96.

[3] Of eleven governors before 1840: four were from Virginia, three from Connecticut, three from Pennsylvania and one from Ohio. Of fifteen U. S. Senators before 1840: six were from Virginia, four from Connecticut, one each from Pennsylvania, Kentucky, New Jersey, North Carolina and Ohio. Of sixty-two Representatives in Congress before 1840: eight were from Virginia, eight from Connecticut, eighteen from

The electoral vote for president in 1804 showed how strongly the State favored the policy of the national administration.[1] Edward Tiffin was elected the first governor and Nathaniel Massie became the first president of the state senate. Thomas Worthington and John Smith were the first to represent Ohio in the United States Senate. All these men had come from the South. Michael Baldwin, speaker of the house, was a loyal follower of Jefferson, and Jeremiah Morrow, Ohio's first representative in Congress, where he remained for sixteen years, came from Pennsylvania.

Excessive Powers of the Legislature—Some Results.—Professor Turner admits that "the democracy born of free land, strong in selfishness and individualism, intolerant of administrative experience and education, and pressing individual liberty beyond its proper bounds, has its dangers as well as its benefits."[2] As developed in practice, too much power had been given the legislature by the Ohio constitution. In 1805 an act was passed giving local justices jurisdiction without jury in debts not exceeding fifty dollars.[3] The Ohio judges declared the law void on the ground that it conflicted with the federal constitution. The legislature was intolerant of such

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Pennsylvania, six from New Jersey, six from New York, four from Maryland, three from Massachusetts, two from Ohio, two from Ireland, and one each from South Carolina, North Carolina, Kentucky, Maine and New Hampshire.

[1] *Cf. Cincinnati Miscellany*, 1845, p. 61.

Republican.		*Federalist.*	
Massie	2,593	Wells	364
Goforth	2,502	Reily	320
Pritchard	2,475	Gilman	190

[2] Frederick J. Turner, "The Frontier in American History," reprinted in Bullock's *Selected Readings in Economics*, p. 53.

[3] *Cf.* S. P. Chase, *Statutes of Ohio*, vol. i, p. 445.

independence and proceeded to impeach the judges.[1] In the fall of 1809 a new doctrine was advocated. It would soon be seven years since the constitution had been put in force, and so it was claimed by many leaders that all civil officers must vacate at the end of this period, and thus clear the field for new aspirants. It was argued that the longest period of appointment by the legislature was seven years, which was the term of the judges of the court. No officer, therefore, could hold his office beyond the expiration of this time whether he had served out his term or not. In December, 1809, a representative of Jefferson county presented a resolution which was amended and passed in January, 1810, sweeping out of office at a stroke the judges over the entire state, the secretary of state, auditor and treasurer.[2] The vote on this resolution stood twenty-seven to seventeen in the house. During the following month the legislature proceeded to fill up the vacancies by selecting supreme court judges and president and associate judges in twenty-six counties, as well as a new secretary of state, auditor and treasurer.[3] Much confusion resulted and many delays in the execution of justice. These seem like the tactics of Andrew Jackson applied by the legislature. The motives of the legislators may be questioned, but it is not a surprising outcome of the plan of giving so much absolute power into the hands of the representatives of the people.

In other states the veto power was very generally employed to some extent at least. In Pennsylvania bills were published before a final vote by the legislature. Sometimes the vote was postponed until the following

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[1] *Cf.* Chase, *op. cit.*, vol. i, pp. 38–40.

[2] *Cf. ibid.*, vol. i, p. 736.

[3] *Cf.* Caleb Atwater, *History of Ohio*, pp. 182–185.

session which gave the people a chance to control the action of their agents. In New York the power was vested in a revising council composed of the Governor, Chancellor and Judges of the Court. In this manner the judges were given the opportunity to pass on a measure before it became a law. But Ohio's experience with the absolute veto power under St. Clair had led them to go over to the opposite extreme and permit no veto power at all. Nothing therefore was allowed to prevent the representatives of the people from exercising their will, however unwise and ill-considered the expression of that will might be.

Atwater, writing in 1838, points out that the legislature possessed too much power and that the veto power was greatly needed.[1] Acts that were not constitutional were passed with little consideration, and laws were amended only to be made worse. The charge was made that the legislators often pursued the policy of amending laws and passing acts of personal legislation as an excuse to prolong the session and draw the daily fees. In such cases the power of the Governor to reject such acts as appeared to be unconstitutional, inexpedient, or unnecessary would have saved the state much money and prevented many evils.

The legislature assumed administrative functions, as well as legislative, in which field such a body is usually inefficient. It undertook to dispose of the lands granted by Congress for the support of schools. An attempt was made at first to lease the lands, and successive legislatures passed many different laws. Besides the general acts, special laws were passed at every session granting the privilege to localities to dispose of their own school

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[1] *Cf. History of Ohio*, pp. 172–173.

lands, or giving to individuals special concessions. Not infrequently members of the legislature profited personally by the action. This method tended to benefit the lessees rather than to provide a wise administration in the interests of public instruction. The legislature as trustee was wasting the funds placed in its charge by the federal government.[1]

This is only one example of the very extensive personal and local legislation which filled volumes of the statutes during the early period of the State's history while the legislature had unlimited power.

The legislature entered into the construction of state canals and turnpikes after 1825, and grew constantly more lavish in its expenditures. Two canals were built between Lake Erie and the Ohio River by the State, and besides it subscribed stock in private canal and turnpike companies. A board of canal commissioners had charge of this vast work, but every year, as the statutes will show, detailed instructions were given to the board which was often hindered by too much legislative control. There was always a decided opposition to control by a board or commission.

A committee of the Ohio Whig convention of 1837 reported certain state evils that ought to be corrected. They pointed out the great amount of personal legislation that was enacted at the expense of public spirit, and declared that private corporations were authorized by the legislature for personal gain. Railroads, turnpikes, canals,

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[1] Atwater was chairman of a committee appointed in 1821 to examine into the whole subject of education in Ohio. The committee reported that more money had been expended by the state in legislating concerning school lands than they had yet or ever would produce unless better managed, and that the lessees were the real beneficiaries. *Cf.* Atwater, *History of Ohio*, p. 258.

banks, and insurance companies were incorporated, but many never materialized, except to the profit of the promoter. Speculation was therefore encouraged by the legislature. The committee maintained that local laws formed the great bulk of state laws passed at each session. The assembly had wasted both time and public money, and the general good was often sacrificed to satisfy private or local ambitions and patronage.[1]

The extravagances of the state legislature in these matters led to the demand for some limitations when the constitutional convention met in 1851. In the new instrument the legislature was prevented from subscribing the credit of the state in private corporations, and from making internal improvements. Special legislation was also prohibited.[2]

States' Rights in Ohio.—The South had censured the Hartford convention, and both South and West, whose interests up to the close of the War of 1812 were essentially the same, had supported the national government enthusiastically in the war. It seemed that states' rights were no longer an issue.[3]

Ohio's delegation in the House of Representatives favored by a vote of three to two the charter of the Bank in 1816.[4] Two branches were established in Ohio, one at Chillicothe, the other at Cincinnati.[5] Speculation followed

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[1] *Cf. Niles Register*, vol. lii, pp. 328–329.

[2] *Cf.* S. P. Orth, "Administration in Ohio," *Columbia University Studies*, vol. xvi, pp. 171–173.

[3] Calhoun had argued in favor of the tariff and internal improvements as nationalizing policies and Madison had signed the bill to recharter the United States Bank.

[4] *Cf. House Journals*, March 14, 1816, for vote.

[5] *Cf.* Jacob Burnet, *Notes*, pp. 407–408. He claims that committees from Ohio solicited these branch banks.

the war of 1812, state banks multiplied, circulating paper greatly expanded, and much land was purchased on credit. Hard times soon followed. The United States Bank tried to compel the state banks to redeem notes in specie. A panic ensued, because few banks in the South or West could so redeem their paper. Manufacturers were in distress, prices fell on products and land, and workmen were dismissed. Conditions in Cincinnati were serious. By foreclosure the United States Bank came into possession of large amounts of property. Benton declared in his opposition to the Bank, "All the flourishing cities of the West are mortgaged to this money power." [1] The Bank was called "The Monster," and opposed as an "engine of aristocracy."

As early as 1817 the legislature of Ohio considered the question of taxing the United States Bank in the State but postponed action. In the meantime the panic had developed and the Bank's policy had fallen into disrepute with the people of Ohio. Furthermore, between 1817 and 1819 Maryland, Tennessee, Georgia, North Carolina and Kentucky had passed acts taxing the Bank within their bounds.[2] Ohio's interests were those of the South on this issue. There was a popular demand for relief; so the Ohio legislature, backed by public opinion and the state banking interests, passed a law, in February, 1819, taxing the branches at Chillicothe and Cincinnati $100,000. This act declared the Bank to be in violation of the rights of the State. It was made the duty of the auditor of the state to collect the tax, even to enter the bank and take the money by force if necessary. This he did in the face of an injunction secured by the federal authorities. Open defiance to the Supreme Court decision, in the case of McCullough v. Mary-

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[1] *Cf.* F. J. Turner, *New West*, p. 137.

[2] *Cf. ibid.*, p. 137.

land, on this very point was shown by the state authorities. In this case Justice Marshall had rendered an elaborate opinion in which he denied the right of Maryland to tax the United States Bank. Ohio thus early asserted the principle of nullification.[1]

The matter was referred to a committee of the State legislature for report. The report affirmed adherence to the doctrine of the Virginia and Kentucky resolutions of 1798 and 1800, and asserted that in great questions of political rights and powers a decision of the Supreme Court was not conclusive of the rights decided. The people had agreed to this doctrine in the election of Jefferson in 1800 and they were the source of all power. The committee recommended that the decision of the court be ignored and argued that the state had the right to interpret the constitution where sovereign rights were involved, "as in all cases of compact among parties having no common judge." They recommended further that the bank be declared an outlaw by legislative act which was done in 1821. By this latter act the protection of the state laws was withdrawn from the Bank in certain cases.[2] But finally another decision of the Court, in the case of Osborn v. United States, was accepted by Ohio and the matter was closed.[3] The national government had already passed a relief act to alleviate the financial distress of the West, and had reduced the price of land, so that the immediate cause of the excite-

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[1] *Cf.* D. J. Ryan, "Nullification in Ohio," *Archaeological and Historical Quarterly*, December, 1888. Feeling in the state ran high and the elections of 1819 were affected by the controversy. *Cf. Niles Register*, vol. xvii, p. 139.

[2] *Cf. House Journal*, 1821, pp. 199-233, for full report of the above committee. It is most orthodox Jeffersonian doctrine. They still maintained the right to tax private corporations created by Congress and declared the Bank to be a private corporation.

[3] *Cf.* 9 *Wheaton Reports*, 738.

ment was removed and the right to tax the bank was no longer urged by the State. The attention of the country was diverted to a more important issue, the slavery controversy.

Local Government in Ohio.—In the sparsely settled regions of the Northwest Territory, the larger local unit, the county, was a more natural one for a society depending almost wholly on agriculture and gathering little in towns. The southern settlers were already familiar with this unit, having had no such local solidarity, either political or religious, as was found in New England. In fact the spirit of the early settlers endured little restraint by government of any sort, and had opposed from the start the paternal policy of the central territorial government to control their local affairs. During the territorial stage, as we have described, counties were established and local officers were appointed by the governor. A court of Quarter Sessions in each county was appointed by the governor, with powers, fiscal and administrative, similar to those long exercised by this court in the Southern States. It had the power to organize townships and fix boundaries and to take care of certain local functions for which officers were appointed by the court, *i. e.* clerk, constable, and overseer of the poor.[1] It is to be noted, therefore, that the township government, as established in Ohio, was quite different from the New England town system. The township was not the chief local unit but rather a subdivision of the county and was organized by the powers above in the county which was the chief local unit. At first even the jurisdiction of the justices was co-extensive with the county but this made collection of debts so difficult and expensive that in 1799 jurisdiction was limited to the township of residence.[2] In this

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[1] *Cf.* J. A. Fairlie, *Local Government*, pp. 36–53.

[2] *Cf.* Jacob Burnet, *Notes*, p. 311.

composite system, at first the township had very limited local functions which increased as population increased and became concentrated in local centers. The towns and villages soon obtained a large degree of self-government under special incorporation acts passed by the legislature.

When Ohio became a state in 1802 the local government was organized on a more democratic basis. All the fiscal and administrative powers of the court of quarter sessions were transferred to a Board of Commissioners for each county, the members of which were elected by the people. Provision was made at the legislative session of 1803-04 to incorporate townships whose size and boundaries should be regulated by the board of commissioners of each county.[1] In the county the sheriffs, coroners, and justices, formerly appointed, were elected by the people. The local affairs of the township were managed by trustees also elected by popular vote. Local powers had begun to concentrate more in the smaller division which now possessed some power to levy taxes and cared for the public highways. In all states admitted after 1800 there was a strong tendency to extend the principle of local popular elections. The followers of Jefferson in Ohio were true in this respect to the principles of their leader. The individualistic, independent founders of these early communities in the West preferred to limit the powers of the larger administrative group, and to entrust more and more to the local unit.[2]

It is evident then that the early settlers in Ohio were ever ready to protest against any aristocratic tendencies in government, and that they extended the principles of democratic control, even to an extreme in some cases.

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[1] *Cf.* S. P. Chase, *Statutes of Ohio*, vol. i, pp. 397-400, chap. xxxv, for text of the law.

[2] *Cf.* James Bryce, *American Commonwealth*, 3rd ed., 1895, vol. i, pp. 589-610 for a further and more general treatment of local government in the states of the Northwest Territory.

CHAPTER IV

THE PROBLEM OF SLAVERY AND THE FREE BLACK PROJECTED INTO OHIO

The Controversy in the Territorial Stage and in the Constitutional Convention. — Professor Turner says, "The southern pioneers in the Northwest formed a transitional zone between the northern area and the slave states south of the Ohio." [1] Many of these settlers came to Ohio after having freed their slaves. Others had no slaves and because they could not compete with the economic system that fostered slavery, left the South seeking better opportunity. Some moved north of the River hoping to be allowed to retain their slaves. Petitions were presented to the first territorial legislature (1799), asking permission to bring slaves into the Virginia Military District. These petitions were refused on the ground of the prohibition in the Ordinance of 1787.[2] In the session of 1801 further petitions were presented asking for an act to authorize and require the courts of the Territory to compel specific performance of covenants and indentures entered into for a valuable consideration.[3] The object was evidently to introduce a species of limited slavery by contract or indenture.

But the majority from the South were not of the slaveholding class and were glad to get away from the economic

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[1] *The New West*, p. 94.

[2] *Cf. St. Clair Papers*, vol. ii, pp. 447 and 451, for the text of two petitions.

[3] *Cf.* Jacob Burnet, *Notes*, p. 332.

drawbacks of the system. The early expression of the economic motive for the exclusion of slavery and the free black from the Territory came from Judge Burnet who declared, in answer to the petitions above cited, " It would ultimately retard the settlement and check the prosperity of the Territory, by making labor less reputable, and creating feelings and habits unfriendly to the simplicity and industry, they desired to encourage." [1]

When the Constitutional Convention met in 1802 a hundred or so propositions were submitted concerning the colored people then within the State, although at that time the number was very small. Some wished to make them citizens and encourage their immigration, others to grant only the protection of the laws, and still others to exclude them from the courts as witnesses against whites. The discussion grew so warm that many feared the objects of the convention would be defeated. Therefore most of the propositions were tabled while a constitution was framed which ignored the negro and embraced only the free white population.[2] The votes on granting suffrage and citizenship were very close and opinion was evidently so much divided that President Tiffin cast the deciding vote against negro suffrage.[3]

The question whether slavery should be admitted into the new state came within the work assigned to the committee of the convention on a Bill of Rights. This committee met at President Tiffin's house by invitation. Ephraim Cutler of Marietta was a member and describes in his letters what took place. Mr. Brown, a southern member and chairman of the committee, proposed his ideas in a section

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[1] *Notes*, pp. 306–307.

[2] *Cf. ibid.*, pp. 354 *et seq.*

[3] *Cf.* E. H. Gilkey, *Ohio Hundred Year Book*, pp. 80-81, for notes on the proceedings of the convention.

to the effect that limited slavery be permitted in Ohio, no male to be held after thirty-five years of age, and no female after twenty-five years. Cutler's own vote decided the committee, five to four, against this proposition and the clause finally adopted came from his own pen.[1] Brown claimed that the Ordinance of 1787 would cease to operate when Ohio should become a state and that therefore the people themselves had a perfect right to decide the question of slavery. Some in the convention were anxious to hold out this inducement of a limited slavery to those who might come into the territory from the South and later free their slaves. The chairman claimed that he had introduced a clause which was regarded by the greatest men in the nation as a long step toward emancipation.[2]

When the clause, as written by Cutler, came up for debate before the whole convention, amendments were offered by the friends of slavery to change the form of the clause and weaken it. But after a heated debate, the original form, absolutely excluding slavery, was passed by a ma-

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[1] *Cf.* Julia Cutler, *Life and Times of Ephraim Cutler*, p. 74.

[2] *Cf.* B. A. Hinsdale, *The Old Northwest* (1899), pp. 345-346. Also for Jefferson's supposed connection with the subject, *cf.* Julia Cutler, *Life and Times of Ephraim Cutler*, pp. 74 and 75 (footnote). It seems from this latter reference that Cutler believed that Jefferson himself had some part in recommending the limited slavery clause. Cutler seems to have been told by Worthington of a conversation with Jefferson in which Jefferson expressed the hope that there would not be any effort made for anything further than a limited slavery clause, because the entire exclusion from the state would operate against the interests of those who wished to emigrate from the slave states to Ohio.

Hon. A. H. Lewis, member of the Ohio Senate, 1846-7, had a conversation with Jeremiah Morrow, who told him that when he (Morrow) went to Congress in 1803, as Ohio's first representative, he visited Jefferson and the article on the exclusion of slavery was disapproved by the President who said, "It would have been more judicious to have admitted slavery for a limited time." The above note is simply given for what it is worth.

jority of one vote. The provision in the constitution regulating indenture was evidently aimed at the probable attempts to circumvent this clause against slavery.

There seem to have been two motives working toward the introduction of some sort of servitude, first, the self-interest of slave-holders, second, the political motive which held out a limited slavery clouse as a premium to attract immigration into the new state. But a considerable number of settlers were opposed on principle to the institution of human slavery. Besides, the strong economic interests of the vigorous pioneer population, many of whom had seen the disadvantages of slave labor, prompted them to exclude slavery from the State by a provision in the first constitution.

Legislation in Reference to Negroes, under the Constitution.—There was a large class in the State which was not much concerned to what extent slavery existed in other states so long as the institution did not invade Ohio. These men did not oppose slavery except in practice within their own state. In fact many of them believed that the continuance of slavery in the South was a good business proposition for Ohio,[1] because desirable elements of population were thus drawn to free soil from the South and the State's prosperity was increased. Others looked upon slavery as a necessary evil to be restricted, if this were possible without destroying friendly and business relations with the states south of the Ohio River, but had no particular regard for the rights of the blacks as individuals. To such men, very many of whom had come from the South,[2] the southern

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[1] *Cf.* Caleb Atwater, *History of Ohio*, p. 331.

[2] It is significant that Kentucky, which had 221,000 population in 1800, had only 780,000 in 1840; but Ohio, which had 45,000 in 1800, had increased to 1,519,000 in 1840.

slaveholders looked for support in upholding the institution of slavery where it had been established and in preventing the escape of their slaves.

We are not surprised, therefore, at the treatment accorded the blacks within the State during the first half-century of its history. The same motive, that would exclude slavery for economic reasons, would seek to make it uncomfortable for the incapable and poverty-stricken negroes within the State, in order to deter the immigration of such. The settlers in the southern part of the State knew well the qualities and character of the blacks. They had abundant evidence that freedom did not increase the happiness of the colored man or better his economic condition. Many had soon learned to hold him in absolute contempt. Ohio must not be the dumping-ground for such persons. As most of the incoming negroes settled in southern Ohio this region had most need to protect itself against them.[1]

North Carolina had already (1795) passed a law compelling the freed black to give bond for £200 or leave the state. This act amounted to practical expulsion.[2] Ohio quickly followed this example. At the second session of the legislature it was pointed out that many negroes were coming into the State and that unless something was done the river counties would be infested with a shiftless and dependent population from the border states. Accord-

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[1] Colored people in Ohio:

1800	337	1830	9,568
1810	1,899	1840	17,342
1820	4,723	1850	25,279

Cf. Census of 1850, table v. In 1850 the counties with over 500 each were in the southern part of the state, and only Franklin, Gallia, Hamilton and Ross had over 1000 each. Hamilton, with Cincinnati, had by far the most. *Cf.* table i.

[2] *Cf.* Stephen B. Weeks, *Southern Quakers and Slavery*, p. 219.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
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ingly, an act was passed in the House, in December, 1803, by a vote of nineteen to eight, requiring negroes and mulattoes, before settling in the state, to present a certificate of freedom from some court in the United States. The law also required the families already resident within the state to register within a specified time. One who employed a colored person without a certificate of freedom was made liable to fine, and, in addition, to payment of fifty cents per day to the master of the slave for the service. One who aided a fugitive to escape was subject to heavy fine. An analysis of the vote by counties on this bill shows that the counties having the largest number of southern settlers and the largest negro population favored the bill; while Washington and Trumbull counties, the centers of New England population, voted against it.[1]

In 1807 the law was made more severe. No negro or mulatto was permitted to settle in the state without giving bond to the extent of $500, signed by two freeholders who must thus guarantee behavior and support. It was made the duty of township overseers to remove as paupers all who did not comply with the provision. If enforced, this law meant practical expulsion from the state, as in the case of North Carolina in 1795, but for years it was practically held in abeyance. The law further forbade any negro or mulatto from testifying in a court of justice where a white man was a party. The vote in the House stood twenty to nine but many counties were divided in opinion.[2] It is quite evident that opinion was general over the state that the negro ought to be kept out if possible.

Add to these acts the exclusion of the free blacks from participation in the benefits of the school fund of the state,

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[1] *Cf. Journals of the House*, December 22, 1803, for vote.

[2] *Cf. House Journals*, January 21, 1807.

and it is clear that the negro was completely subordinated during a period of almost a half century.

The law of 1807 was later used to rid Cincinnati of its rapidly increasing negro population which came easily across the Ohio to find refuge in the city. In 1829 notice was given that all who had not complied with the law within thirty days must leave the city. A committee was sent to Canada by the colored people to find out whether they would be welcome there. The governor of Canada promised equal treatment as British subjects. Meanwhile, the time, which had been extended to sixty days, expired before the return of the committee. The people of the city became excited and a mob undertook to expel the negroes who had not complied with the law. Violence prevailed for several days. Even to the city officers the negroes applied in vain for protection.[1] The result was that about half of the colored people of Cincinnati moved to Canada where they formed the Wilberforce settlement.

Judge Burnet, a Whig of Cincinnati, in commenting on these "Black Laws" and the action of Cincinnati, declared that Ohio had excluded slavery and wished to escape its evils. The free blacks were not wanted because their worthless character was familiar to the people of southern Ohio. He defended the laws as "justifiable and commendable."[2] It was only natural that the most severe application of the law should occur at Cincinnati because there the

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[1] *Cf. Report on Conditions of People of Color*, Boston, 1836. Taken from *Proceedings of Ohio Anti-Slavery Convention*, held at Putnam, Ohio, April 22–24, 1835.

[2] *Cf. Niles Register*, vol. xxxviii, p. 145. For other examples of the free colored people's shiftless character, *cf. Niles Register*, vol. xlix, p. 76, and *African Repository*, vol. iii, p. 157. Also *cf. Archaeological and Historical Publications*, vol. vi, pp. 275–285, for facts as to a colony of freed slaves in southeastern Ohio and their failure to become economically independent.

largest number of blacks always congregated. The economic inferiority of the colored population was a lasting cause of antipathy among a people who had settled the region north of the Ohio in order to secure better opportunities. It must also be remembered that this opposition to the immigration of the negroes was not inconsistent with repugnance to slavery as an institution.

There was much persecution of the negroes who resided in the State. In Cincinnati they were not admitted except to the most menial employment. No member of the Mechanical Association of the city was allowed to assist a negro to learn a trade.[1] Even the skilled colored worker was refused employment, or, if the employer received him, it was at the risk of a strike by the other workmen.

Excluded as witnesses in cases where whites were involved and prevented from serving on a jury, the blacks suffered much injustice at the hands of the more vicious whites.[2] These laws continued in force under protest from many good citizens of the State. On January 15, 1839 the House voted against their repeal forty-seven to sixteen, thus showing how strong was the feeling still against negro immigration. An analysis of this vote shows that the demand for repeal came from the northern part of the state where the people did not feel the evil of the negro's presence. The southern counties were still a unit as to the wisdom of the laws.[3]

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[1] *Cf. Report on Conditions of People of Color*, *op. cit.* In 1830 the president of the association was tried for this offense.

[2] *Cf. ibid.* This report cites specific cases on trial where these rank injustices were perpetrated.

[3] *Cf. House Journals*, January 15, 1839, for vote. They speak in the resolution about "indirectly inviting the black population of other states to emigrate to this state, to the manifest injury of the public interest." *Cf. Journal*, 1839, p. 235.

The law of 1807 had contained a provision imposing a heavy fine upon anyone who aided a fugitive slave. But many slaves from Kentucky escaped across the river, to find friends on the Ohio side willing to aid their flight. Dissatisfaction increased on the part of the slave-holders, until in 1839 a protest was sent to the Ohio legislature asking for a more strict fugitive-slave law. The legislature proved subservient to the wishes of the Kentucky slave-owners because the southern counties were almost a unit in their opposition to the entrance of negroes into the state, and, besides, these same counties had very close social and business relations with the South at this period. The Ohio River, as we have shown, was the great artery of trade and the South was the great market for the products of Cincinnati's industries. The steamboat had been perfected on the river, the canals had been constructed, and the interior of the State had been opened by better communication. From a business point of view slavery was a good thing for southern Ohio, especially Cincinnati. The representatives from this region were not inclined to allow disturbance of friendly relations and so the deputation from Kentucky was received with marked courtesy. The analysis of the vote in the House, February 11, 1839, will show that, with fifty-three votes in favor of a drastic fugitive slave law and fifteen opposed, almost all the opposition came from the northern counties where the people were not so closely in contact with the problem.[1]

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[1] *Cf. House Journal*, 1839, p. 423, for the vote. The method of analyzing these votes has been to take the "ayes" and "nays" and classify them by counties, securing the names of the representatives from each county by reference to E. H. Gilkey's *Hundred Year Book*, pp. 186 *et seq*.

The law was, in substance, as follows: The master or his agent was authorized to apply to any judge, justice or mayor, who upon application was required to issue a warrant to any sheriff in the state, directing him

The attitude toward the negro shown in the constitutional convention of 1850 must finally be considered. Ohio's attitude toward the institution of slavery was tending at this time to become strongly anti-slavery, but the opinion of a majority in the convention still remained in strong opposition to the negro immigration and to extending the franchise. Petitions asking for laws prohibiting colored people from entering the state were received in great numbers. Some desired to revive the "Black Laws," which had been repealed the preceding year, and to make them a part of the constitution. Daniel Drake of Cincinnati, one of the prominent Ohio pioneers, asked the convention to prohibit the entrance of both emancipated and fugitive slaves and to provide for laws to favor African colonization.[1] The petitions unfavorable to the negro came very largely from the counties bordering on the Ohio River. Mr. Sawyer, in a debate over the question of allowing the negroes to participate in the school fund, gave utterance to the feeling of these southern counties. He said, "In those counties where abolitionism and free-soilism predominate there are the fewest negroes. It is the southern counties bordering on Kentucky where there is the largest proportion of negroes; and those counties are the least friendly to provisions for the encouragement of their immigration or remaining in the state."[2]

to arrest a fugitive and bring him before any judge in the county in which arrested. If the claimant could prove his legal right to the fugitive, to the satisfaction of the court, then a certificate was issued for removal. A heavy fine and imprisonment were the penalties for hindering the execution of a warrant. The law made Ohio a hunting ground for slaves and enlisted her officials in the quest. It gave every facility for securing a warrant and executing it under a friendly official. Such was the law suggested to Ohio legislators by southern slave-holders.

[1] *Cf. Debates of the Convention*, 2 vols., for the petitions.

[2] *Debates*, vol. ii, p. 12.

The vote of the convention on the extension of the franchise resulted in sixty-six votes opposed to twelve in favor. All those who favored were from the extreme northern counties without exception.[1] Such an extension was evidently not in accord with public opinion and, if incorporated, would have prevented the ratification of the constitution.

The Growth of Anti-Slavery Ideas before 1830.—As early as 1712, Pennsylvania had tried to prevent the importation of slaves but the English government was too much interested in the large profits of the traffic to permit such action. It was not, therefore, until 1780 that a law was passed emancipating those held in bondage.[2] In consequence of this action, the settlers, who came from Pennsylvania to Ohio, had their opinions formed and their traditions established as far as the institution of slavery among themselves was concerned.

The agitation against slavery and attempts at remedy before 1830 were carried on mainly by persons who lived in or adjoining the slave states. Efforts toward amelioration of conditions and gradual emancipation grew up in the South itself and throughout the border states, among liberal-minded and far-seeing people who realized the true evils of the system as well as the difficulties of the problem of emancipation. Such efforts were carried on through the religious denominations, through organized agitation for emancipation, and through the scheme of colonization. These movements all very early touched Ohio, coming with the population from the regions where the agitation had been going on in the southern and border states.

The investigations of Stephen B. Weeks showed the

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[1] *Cf. Debates*, vol. ii, pp. 554–555.

[2] *Cf.* C. A. Hanna, *The Scotch Irish*, vol. ii, p. 137.

early Quaker influence in Virginia as well as in Pennsylvania. This sect had begun to oppose slavery in the South when it had no opponents there. Down to 1765, since emancipation was impossible, they sought to ameliorate the conditions of the slave. They secured a law in Virginia in 1782 permitting the owner to emancipate his slaves. The great body of Quakers owning slaves at once set them free.[1] This period of emancipation was characterized by petitions to the Virginia legislature against slavery and the formation of societies to agitate and persuade slave-owners to set their slaves free.[2] We have already explained that after 1800 large numbers of these Quakers left Virginia to settle in Ohio upon free soil. Their little communities became centers of anti-slavery feeling in Ohio and many routes of the Underground System were operated by them.

In North Carolina also the Quakers were prevented from emancipating slaves by state law but they began their agitation as early as 1758, with the object first to secure permission to emancipate and then to secure rights for the freed blacks. Under such conditions the Quakers often aided the escape of blacks from the state and thus the idea of the Underground Railroad had its origin. On account of the severity of the law, the Friends in North Carolina organized a corporation to take over slaves by assignment from masters willing to emancipate them, and then sent them out of the state. By 1814 over 350 had thus been transferred to the agents of the society. Of these a number had been sent to Pennsylvania and other states in the North.[3] Such movements caused Ohio to retain her "Black Laws" already

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[1] *Cf.* Weeks, *Southern Quakers and Slavery*, p. 212.

[2] *Cf. ibid.*, pp. 213 *et seq.*

[3] *Cf. ibid.*, pp. 224–228.

described. The opening for these free negroes in the North was soon restricted and the African colonization scheme was inaugurated. It must be remembered that many of these Quakers from North Carolina also came to Ohio to settle in the southern counties of the state.

The first journal in the United States to advocate immediate and unconditional emancipation was issued by a Quaker, Charles Osborn, at Mount Pleasant, Ohio, in 1817. Osborn was born in North Carolina, but at nineteen years of age moved to Tennessee where in 1814 he helped to organize emancipation societies. From here he travelled over the South agitating for the freedom of the slave, and organizing societies for that purpose.[1] In 1816, after founding organizations of this character in his native state, he removed to Ohio and in August of the following year published the first number of the "Philanthropist." Garrison was but a boy when Osborn began his agitation against slavery.[2]

Benjamin Lundy, another prominent Quaker anti-slavery advocate, was an agent for Osborn's paper, the "Philanthropist." He lived at St. Clairsville, Ohio, where in 1815 he called a few friends together and organized an anti-slavery society called the "Union Humane Society."[3] After Osborn sold his paper, Lundy published, in 1821, "The Genius of Universal Emancipation" at Mount Pleasant, Ohio. He soon moved the paper to Tennessee where he continued to organize manumission and colonization societies. He finally established the paper at Baltimore. There he became the first great abolition journalist and made his influence strongly felt in directing the agitation.

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[1] *Cf.* Weeks, *op. cit.*, pp. 235 *et seq.* See also footnote.

[2] *Cf. ibid.*, p. 237 (footnote).

[3] *Cf. Ohio Archaeological and Historical Publications*, vol. viii, p. 156 (footnote). Also shows Lundy's connection with the "Philanthropist."

Before 1830 anti-slavery societies had appeared in New Jersey, Kentucky, New York, Pennsylvania, Tennessee, Ohio, North Carolina, Virginia and Maryland. In the Southern and Middle States there were at this time over 100 such societies, while New England had none.[1] They held meetings, issued addresses, petitioned legislatures, protected negroes, and published papers to direct public opinion. From 1794 to 1829 delegates from these local societies in the border states met in convention, at first annually, and then at two and three-year periods. This organization was known as the "American Convention of Delegates from Abolition Societies." [2]

As slavery grew more profitable and opposition to anti-slavery agitation in the South became stronger, this convention declined, giving place to the colonization movement.

In Ohio societies were very early organized to oppose slavery. One of these, organized by Lundy, has already been mentioned. Many men of strong personality came into the State from Pennsylvania and the South with decided convictions against slavery. About these men gathered little groups that shared their feelings.[3] The number of groups increased under the pressure of opposition and the need for better organization.

The frontier religious denominations, the Methodists, Presbyterians and Baptists, had a large part in promoting anti-slavery opinion. The churches were recruited on the extending frontiers largely from a people that did not own slaves. The governing bodies of these churches had early expressed themselves as opposed to the institution.

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[1] *Cf.* A. B. Hart, *Slavery and Abolition*, American Nation Series, vol. xvi, pp. 160–161.

[2] *Cf. ibid.*, pp. 161–162.

[3] *Cf.* C. T. Hickok, *The Negro in Ohio* (1896), pp. 147-148.

In the first constitutional convention of Kentucky, in 1792, there was a resolute effort to insert a clause for the gradual abolition of slavery in the State. There were three Baptist, one Methodist, one Dutch Reformed, and one Presbyterian minister in the convention, all of whom voted for the clause. One of these ministers was later elected governor, and another, David Rice, moved later into Ohio, where he became active in anti-slavery agitation.[1] Many others of these strong opponents of slavery moved on from Kentucky and Tennessee into Ohio to become leaders of the anti-slavery movement.[2] John Rankin, the noted abolitionist preacher of southern Ohio, came from the region of eastern Tennessee, where Lundy and Osborn had organized anti-slavery societies. Rankin, after coming to Ohio, published his "Letters on Slavery," which Hart calls a sort of text-book for abolitionists.[3]

The Synods of the Presbyterian Church in western Virginia, Pennsylvania, Ohio and Kentucky during the first quarter of the century opposed slavery and favored emancipation of some sort.[4] Such also was the general attitude of Methodists and Baptists. They had much to say in resolutions about the moral evils of slavery. Even in 1820, in Tennessee and Kentucky, the Methodist Church was making it very uncomfortable for members who held or bought

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[1] *Cf.* Roosevelt, *Winning of the West*, vol. iv, p. 222.

[2] *Cf.* William Birney, *James G. Birney and His Times* (1890), pp. 431–435. These pages describe a number of specific cases giving the biography of many of the men who came to Ohio and who afterwards continued their opposition to slavery.

[3] *Cf. Slavery and Abolition*, American Nation Series, vol. xvi, p. 159.

[4] In 1818 the Presbyterian Assembly declared against slavery as a "gross violation of the most precious and sacred rights of human nature." It further declared it to be the duty of Christians, as fast as possible, to efface the blot and obtain complete abolition. *Cf.* L. W. Bacon, *A History of American Christianity* (1901), pp. 268–269.

slaves.[1] Soon after 1830 the attitude of the churches began to change. The reasons for this change will be presented in a following section.

Colonization. — Another solution for the vexing problem of slavery had been early advocated in the South itself. In 1816 the Colonization Society took definite organization, with the object of transporting the freed slaves out of the country. We have noted already that the Quakers in North Carolina availed themselves of this means of helping the negro when they could no longer send him north. The southern people held the free black in contempt because of his worthlessness, and feared him because of his power to do harm. Consequently, the state legislatures of Virginia, Kentucky and Maryland were persuaded to contribute money for the support of the society in the hope of getting rid of an undesirable element in the population. Many persons thus hoped to encourage voluntary emancipation. The churches regarded the movement as benevolent and missionary in its outlook.[2] During the decade 1820-1830 the Society, with the expenditure of $100,000, transported only 1,162 blacks.[3]

Southern Ohio had many societies, because this method of solving the difficult problem appealed to many as an easy and quiet way of getting rid of a despised people. An examination of the records of the Colonization Society, published in the *African Repository* from year to year, shows

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[1] In 1824 the General Methodist Conference passed a resolution on slavery, declaring it a great evil, and making a slaveholder ineligible to office in the church where the state permitted emancipation. The resolution also emphasized the need of teaching slaves. *Cf.* Nathan Bangs, *A History of the Methodist Episcopal Church* (1845), vol. iii, p. 275.

[2] *Cf. African Repository*, vol. xxix, p. 314.

[3] *Cf.* Hart, *op. cit.*, pp. 163-164.

that there were societies over the entire state, but that the most active ones were located where the negroes were most numerous. It must be remembered, too, that the strong anti-slavery counties of the northern part of the state did not strongly favor colonization because they did not consider it an adequate or just remedy for the evils of slavery.[1] Cincinnati contributed most in money to the support of the society, since this city had the most negroes and was most interested in getting rid of them without stirring up any trouble with the South.[2] The legislature passed resolutions favoring the scheme.

The matter was introduced also into the constitutional convention of 1850. Here, too, appeared the division between the southern and northern counties of the state.[3] The convention finally drew up a memorial, signed by two-thirds of the members, which was presented to the United States Senate by Senator Ewing from Ohio. It requested the federal government to establish a line of steamers between the United States and Liberia, on the ground of giving an impulse to colonization.[4] The southern states were taking steps to drive out their free blacks, and Ohio did not want them. Why not send them to Africa? The Cincinnati papers were emphasizing in strong terms the need of self-protection. They held up to view the dark picture of a time soon coming when white laborers would be crowded

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[1] This attitude is shown by the vote in the House, Feb. 4, 1850, on a resolution requesting the general government to use all honorable means to induce the free blacks to emigrate to Africa. The northern anti-slavery counties opposed the resolution. *Cf. House Journal*, 1850, p. 280.

[2] These contributions are recorded in the *African Repository*, from year to year.

[3] *Cf. Debates*, vol. ii, p. 604.

[4] *Cf. American Colonization Society Reports, Thirty-fourth Annual Report*, 1851, p. 74.

out by a "pestiferous class of ignorant blacks," and predicted the reign of crime and want.[1]

But in spite of all the efforts to stimulate interest in colonization in Ohio, from 1820 to 1853 only forty-eight colored persons were sent from Ohio to Africa. Of these, forty-one were sent in a single year (1833).[2]

More Radical Abolition and Anti-Abolition in Ohio.—Through the early years of Ohio's history, little groups of earnest men had gathered about certain leaders who had no compromise to make with slavery. As has been pointed out, many of the early leaders came from the South itself, where they had become familiar with the evils of slavery. With them there was no question of expediency in dealing with the problem. They could not do less than advocate absolute abolition. After 1830 public opinion in the South was so opposed to an open expression of anti-slavery views that many abolitionists removed to the free states. In Ohio the settlers from New England were pronounced anti-slavery men. Altogether there was a considerable number of men scattered over the state who were ready to take heroic measures to rid the country of the stain of human bondage, and for whom economic interests were not the ruling motive. Naturally therefore a more radical and effective opposition to slavery developed.[3]

The development of more radical abolition in Ohio can be shown best, perhaps, in the life of James G. Birney, who later was nominated for President by the Free Soil Party.

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[1] *Cf. American Colonization Society Reports, op. cit.*, p. 14.

[2] *Cf. African Repository*, vol. xxx, p. 121.

[3] *Cf.* C. A. Hanna, *Historical Collections of Harrison County*, pp. 137–138. This gives account of abolition in southeastern Ohio. The Short Creek Valley from Cadiz to Mount Pleasant was an abolition centre. Scotch-Irish and Quaker settlers favored abolition. This is the region where Osborn and Lundy first advocated emancipation.

Born at Danville, Kentucky, in 1792, of Scotch-Irish descent, he early came under the influence of Rev. David Rice, the Presbyterian emancipationist who labored to secure the clause against slavery in the first Kentucky constitution. In 1832 Birney was engaged, in different parts of the South, in the work of pushing the colonization movement. Later he began organizing emancipation societies in his native state.[1] These did not meet his expectation.

Having lost faith in colonization and gradual emancipation as solutions of the problem, he began the more radical course of anti-slavery agitation in 1834 and 1835. During the first of these years he published a letter on colonization which attracted national attention. He was now an abolitionist in a slave state. Ostracized in Kentucky, he came to Ohio in 1835.

The anti-slavery forces of Ohio, 110 delegates from twenty-five counties, had just assembled at Putnam, near Zanesville, to organize a state movement. Of these delegates eighty-three, or seventy-five per cent, came from sixteen southern counties of the state. Washington county, the center of New England influence in southern Ohio, was not represented. The president of the convention was Colonel Robert Stewart, of Ross county.[2]

The time was ripe for the appearance of Birney in Ohio. He attended the convention at Putnam and was elected a corresponding member. He took part in its deliberations and influenced its decisions.

His next move was to attempt the publication of an abo-

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[1] *Cf.* William Birney, *James G. Birney and His Times*, pp. 111–132.

[2] *Cf. Proceedings of the Anti-Slavery Convention at Putnam, Ohio, 1835*, pp. 1–3. This records the names of delegates by counties, officers, *etc.* Also *cf.* Birney, *op. cit.*, pp. 166–170. He gives the names and sketches of the leaders at this convention. The Lane Seminary group and John Rankin were prominent.

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lition paper in Cincinnati, to be the organ of the anti-slavery forces of the Ohio Valley. Three of the four Cincinnati dailies published unfriendly paragraphs calling the abolitionists fanatics. The *Post* said, " Send them (the abolitionists) back whence they came, and if any of their authors or the agents of them should be found here, lynch them." [1] Both political parties opposed abolition, and these papers were their organs. Birney was notified that, if he published an anti-slavery paper in the city, the authorities would not be able to protect his property or person against violence. He did begin the publication of the " Philanthropist," in December, 1835, outside the city. The *Whig* of Cincinnati said about it, " We deem this new effort an insult to our slave-holding neighbors and an attempt to browbeat public opinion." [2]

Cincinnati was vitally interested in maintaining harmonious relations with the South, to which the city was bound by many economic and social ties. Before this time the state historian, Caleb Atwater, had declared that, " as a state it is our interest, in Ohio, to have slavery in the slave-holding states for a century yet, otherwise our growth would be checked. The broad and deep streams of wealth, numbers, enterprise, youth and vigor of the slave-holding states, now rolling into Ohio like mighty floods, would be stayed." [3] Such an utterance shows the deep underlying cause for a violent opposition to the more radical abolition views in Ohio after 1835. These abolitionists were the friends of the free blacks and the fugitive slaves. They were giving the slave-owners of the border states no little concern, and complaints were coming from Kentucky against the assistance rendered by Ohio citizens to fugitives. The southerners feared also

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[1] *Cf.* Birney, *op. cit.*, p. 205.

[2] *Ibid.*, p. 209.

[3] *History of Ohio* (1838), p. 331.

that the abolitionists were planting seeds of discontent which might result in insurrection among their slaves. Southern Ohio thus became the battle-ground of opposing forces and Cincinnati naturally became the center of the struggle.

In January, 1836, a public meeting was held in Cincinnati, called by capitalists, merchants, tradesmen, and politicians, to suppress abolition agitation. Mayor Davies presided while both Whig and Democratic politicians were seated on the platform. No violence was attempted on this occasion.[1]

Birney now moved his paper into the city, mob violence soon followed, and his property was destroyed.[2] The sympathy of the authorities protected the leaders and no effort was made either to prevent or punish. In this case, as in many others, the agitation led to violent attempts to suppress free speech and to encroach on the rights of citizens of a free state. But the paper was reëstablished and continued its bold declaration of the views of its supporters.

In 1840 Birney took a final step by entering the race for the Presidency as the candidate of a third party whose avowed purpose was the abolition of slavery. The two old parties had adherents in both North and South, and to hold both of these elements in a solid organization became increasingly difficult as the gravity of the slavery question increased. The result was a long compromise by both Whigs and Democrats.

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[1] *Cf.* Birney, *op. cit.*, pp. 211–215.

[2] *Cf. ibid.*, pp. 241–255. Before the mob, a meeting was called "to decide whether they will permit the publication and distribution of abolition papers in the city." A committee of twelve was appointed, with Judge Burnet and other prominent Whigs and Democrats, to remonstrate with Birney. Birney refused to discontinue the paper on the ground that it was suppression of free speech and disgraceful subservience to the South. The newspapers incited the mob to violence.

Lane Seminary Debate and Secession.—The Seminary at Cincinnati had been a center of slavery discussion.[1] The group of students from the South included sons of slaveholders, and both sides of the problem were discussed. Finally in 1832 a debate was arranged. For eighteen consecutive evenings warm discussions on colonization and abolition continued. A majority of the students became abolitionists and went out into the city among the colored people to establish Sunday and day schools for the children.

The trustees of Lane then voted to suppress discussion in the interests of the seminary, but when free speech was curtailed four-fifths of the students withdrew and many of them joined in a public statement that they could not give up their right to inquire into slavery.[2] These students became the missionaries of abolition. Asa Mahan, a Cincinnati minister, resigned from the board of trustees of the Seminary, and John Morgan, a member of the faculty, left the institution. These men with about thirty students moved from southern Ohio to Oberlin where was begun practically the first organized and aggressive abolition movement in Ohio.[3] This town and the college founded there became the great abolition center of the West.[4] Thus the intolerance of Cincinnati and southern Ohio toward the free expression of

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[1] *Cf.* W. H. Venable, *Beginnings of Literary Culture in the Ohio Valley*, p. 240. Mrs. Stowe wrote, "If the abolition excitement had stirred up Boston, it had convulsed Cincinnati."

[2] *Cf.* A. B. Hart, *Slavery and Abolition*, pp. 190-191.

[3] *Cf.* A. B. Hart, *Salmon P. Chase*, American Statesmen, vol. xxviii, pp. 41-42.

[4] In 1843 a bill was introduced into the Ohio legislature to revoke the charter of the college on account of its work for abolition. This bill was postponed in the House by a vote of thirty-six to twenty-nine. The opposition votes came from the southern and central parts of the state. *Cf. House Journals*, 1843, pp. 227-8.

opinion on slavery forced the advocates of abolition into an open and more aggressive opposition. Asa Mahan became president of Oberlin College on condition that colored students be admitted. The trustees yielded on this point only when they found it necessary in order to secure the services of Mahan as their president.

Anti-slavery societies grew rapidly in numbers under the agitation now carried on, until the convention, before mentioned, at Putnam called together the forces of anti-slavery in order to organize a state movement. Attempts to suppress freedom of expression only served to increase the number of societies in the parts of the state where opposition was strong. Social pressure on the one side was met by stronger organization on the other. Whereas the number of local societies in 1836 was 120, the next year it almost doubled, becoming 213 with 17,253 members.[1]

At this period of storm and stress there appeared a marked change in the attitude of the religious denominations. The frontier churches had a large membership, North and South, which they desired to hold together. As in political affairs, compromise resulted. Many southern preachers had discovered that slavery was just and righteous, to be defended by citations from the Bible. The South had become more intolerant, because of economic considerations, the extreme methods of abolitionists, and a panic of fear following the Nat Turner insurrection. There was manifested, in turn, in the North, especially in southern Ohio, much sympathy with the southern point of view, as well as prejudice against the negro and disgust with

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[1] *Cf.* Caleb Atwater, *History of Ohio*, p. 324. Also on page 329 Atwater points out how few anti-slavery societies were organized in the central part of the state, and accounts for it by the freedom of discussion there as compared with the southern part of the state.

the methods of abolitionists. There was a growing fear of disunion. Political parties were competing for southern votes, commercial houses for southern business, and, in the rising frenzy of excitement, the religious sects tried to conciliate opposing factions by concessions or silence. Social pressure was working within the churches to suppress free expression of opinion.

During November, 1835, the Ohio Annual Conference of the Methodist Episcopal church met at Springfield, Ohio. A committee reported on abolition and colonization. No offense could be given by indorsing colonization as a "noble and benevolent institution" which did not disturb the "peace and harmony of society." But the same committee condemned abolition in sweeping terms, including the anti-slavery societies and their agents. It characterized the measures of the abolitionists as high-handed, calculated to produce alarm and give offense in the South. The right of each state to settle the slavery issue for itself was asserted and the committee condemned all inflammatory lectures and publications in favor of immediate abolition.[1]

The next year, the General Conference at Cincinnati condemned abolition and censured two members for speaking at anti-slavery meetings. This action was taken by a vote of 120 to 14, showing how overwhelming the sentiment on the subject was.[2] The churches of southern Ohio closed their doors to free discussion. They were thus subservient to the opinions of the South and followed the wishes of a large majority of the church membership. This agita-

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[1] *Cf. African Repository*, vol. xi, pp. 332-333.

[2] *Cf.* Nathan Bangs, *A History of the Methodist Episcopal Church* (1845), vol. iv, pp. 242-246. Resolutions on page 246. One resolution states, "We disclaim any right, wish or intention to interfere in the civil and political relations between master and slave as they exist in the slave-holding states."

tion grew until the separation finally took place within the church itself.

The same attitude was shown in the Presbyterian and Baptist churches after 1830 until they too were divided in the struggle.[1] At this period southern Ohio was most strongly represented in these three denominations, as will be shown in the next chapter. As a result the struggle between opposing factions in the churches became most evident in this region.

The attitude of the state authorities with reference to the agitation against slavery is also a matter of record. Governor Lucas, in a message to the legislature in 1835, deprecated the conduct of persons of the free states who were arousing excitement and alarm in the South.[2]

In 1839 the legislature recommended by resolution that the regulation of slavery be left to each state, and declared that agitation against slavery was a violation of faith among the states of the confederation. The schemes of the abolitionists were characterized as, " wild, delusive, and fanatical, tending to destroy the Union. Further, it was held to be " unwise, impolitic and inexpedient " to repeal the " Black Laws " in the state, because this would put blacks on an equality with whites and would invite the colored population from other states to the injury of public interests.[3] These resolutions and others of a similar character were passed by large majorities, the only opposition of any importance coming from the extreme northern part of the state. Such action shows how much the Ohio legislature was in sympathy with the southern view at this

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[1] *Cf.* Hart, *Slavery and Abolition*, pp. 213–214.

[2] *Cf. Niles Register*, vol. xlix, p. 291.

[3] *Cf. Niles Register*, vol. lvi, p. 66. Also *House Journals*, 1839, pp. 33–234.

period, or at least how reluctant it was to disturb harmonious relations of economic and social interests, and how absolutely opposed the members were to encourage the immigration of colored people from the slave states.

The Underground Railroad and the National Fugitive-Slave Law of 1850.—It has already been pointed out that the Quakers of North Carolina gave secret assistance to escaping slaves early in the century and thus suggested the idea of the underground system which became so effective in Ohio after the rise of a definite anti-slavery movement in the state.[1] Many of these same Quakers settled in their little communities in southern Ohio and aided the fugitives to freedom. This was a practical method of emancipation that appealed to many besides Quakers.

There were many anti-slavery preachers in southern Ohio, several of whom have been referred to in preceding pages, who, with their church members, became active in aiding escaping slaves.[2] Presbyterians, Baptists, Scotch Covenanters and Methodists were mentioned in connection with this work from the close of the war of 1812. Western abolition was more practical than eastern because it was face to face with slavery and many of its warmest advocates were men who had left the South because of slavery. Rigid state and national laws made the work of these practical emancipators necessarily secret, and therefore dangerous and subject to social disapproval, especially in the southern part of the state. They were persecuted, hated, and visited with the penalties of the law.

The organization of the state anti-slavery society in 1835 and the rapid spread of local societies gave better opportuni-

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[1] *Cf.* W. H. Siebert, *The Underground Railroad* (1899), p. 117. Organized by the Coffin family as early as 1819.

[2] *Cf. ibid.*, p. 32 for some of the prominent names.

ties to assist fugitives from place to place. The operators of the Underground Railroad were generally active members of these societies. One of the most active of these was Rev. John Rankin, pastor for thirty-three years at Ripley on the Ohio River, who had come from the South and had been most influential in gathering the anti-slavery forces of the State. Even Garrison sometimes spoke of himself as a disciple of Rankin.[1] His home on the banks of the Ohio became a refuge for escaping slaves.

Levi Coffin, a Quaker, came from North Carolina to Indiana in 1826 and later to Cincinnati. He had been a member of the family which organized the underground system in his native state a few years before, and he became known in the North as the "President of the Underground Railroad." By his own personal efforts in Indiana and Ohio he aided the escape of hundreds of slaves.[2]

Through Ohio lay the shortest route between the slaveholding states and Canada, and along the shores of Lake Erie was the Western Reserve with its New England population which was largely anti-slavery in its views and ready to assist the fugitive. Therefore, more underground lines naturally developed in Ohio than elsewhere. The long line of contact with slave territory, and the presence of many friends of the slaves along the river favored the escape of the fugitives. The routes from Kentucky and western Virginia, with northern terminals at Cleveland, Sandusky and Detroit, were used more than any others. There were more stations in the southwestern part of the state around Cincinnati, and in the southeastern part because in these regions anti-slavery men were most numerous.

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[1] *Cf.* Siebert, *op. cit.*, p. 308.

[2] As to why Coffin came to Cincinnati to live, *cf.* C. T. Hickok, *The Negro in Ohio*, p. 151.

Prof. Siebert estimates, after a careful investigation of the subject, that during the period, 1830 to 1860, at least 40,000 fugitives were helped on Ohio soil.[1] The same writer tabulates by name and county over 1500 persons actively engaged in this work of aiding the fugitive slaves, but this number can include only a mere fraction of those actually engaged.[2] The tabulation indicates where the greatest amount of aid was given.

The underground system became a potent force in shaping public sentiment because it diffused knowledge throughout the State as to the evils of slavery, and made the people conscious before long that the existence of the institution in neighboring states was limiting their own freedom and endangering the independence of the commonwealth. The complaints from the South, especially from Kentucky, had already resulted in sweeping legislation as to fugitives and strong resolutions upon the abolitionists. But the anti-slavery forces only drew into closer organization and became more determined. Southern Ohio became a battleground, not only of opinions, but in fact between the fugitives and their friends on the one side and the pursuing slave-hunters on the other.

The very year (1839) that the Ohio legislature passed the legislation above referred to, a riot occurred at Marion, Ohio. A negro had been claimed as a fugitive from Virginia. He was brought before the court and after a hear-

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[1] *Cf. Underground Railroad*, p. 346. Map of routes p. 112.

[2] *Cf. ibid.*, pp. 415–431. See summary on p. 351. Counties showing the largest number of workers:

Ashtabula	51
Brown	69
Erie	62
Gallia	45
Hamilton	54
Highland	44
Jefferson	42
Logan	53
Morgan	71
Stark	40
Washington	50

ing was set free. The alleged owners seized him in open court. They were unable however to prevent the crowd from finally rescuing him.[1] In another case, in 1845, three Ohio citizens of Washington county, accused of assisting escaping slaves, were seized by Virginians, taken across the river to Parkersburg, Virginia, and there lodged in jail. Here was a conflict of jurisdiction. Bail was refused and the Ohio citizens were finally tried in Virginia for an offense committed on Ohio soil.[2]

The incident at Cincinnati in 1836 has already been described in the story of the attempt to suppress free speech by destroying Birney's press. Lane Seminary had suppressed discussion and the churches had closed their doors to open debate of the question of slavery. But why multiply cases, showing the invasion of the liberties of the citizens of a free commonwealth because of the existence of slavery on the borders of the State?

Although many cared nothing for the freedom of the slave, they did care to preserve their own independence. A new danger from slavery began to loom large and a more determined anti-slavery movement began to crystallize, not so violent as before 1840, but far more effective.[3] Four years after its enactment, Ohio's fugitive-slave law was repealed. Salmon P. Chase, at this time a resident of Cincinnati, had witnessed the disgraceful mob of 1836 with disgust and deep concern.[4] He was aroused not so much by the wrongs of the negro as by the danger to the liberties of the whites.

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[1] *Cf. Niles Register*, vol. lvii, p. 41.

[2] *Ibid.*, vol. lxviii, pp. 373-374.

[3] *Cf.* Caleb Atwater, *History of Ohio*, p. 329, says, "Every riot, mob and disturbance of peaceable people assembled for deliberation on slavery or anti-slavery adds to the number of the friends of anti-slavery in the state."

[4] *Cf. S. P. Chase*, American Statesmen, vol. xxviii, p. 48.

He realized how few were open advocates of free opinion in the city. Chase and Birney became the political exponents of anti-slavery in southern Ohio, as Giddings and Wade were in the northern part of the state.

It must be pointed out also that, during the last two decades before the Civil War, the commercial relations between Ohio and the South were not so important as they had been. This was because of a rapid development of transportation by canal and railroad. The Northwest was now more closely connected with the Middle and Eastern States.

Infringement of the rights of Ohio citizens by the South itself could not pass unchallenged. The opponents of slavery were being drawn together by a pressure from outside as well as by persecution within the state. The South herself became responsible for a change of feeling after 1840, as well as for a change in the method of its expression. After 1840 there was a third political party, devoted to the cause of freedom, which gathered to itself the anti-slavery advocates who were willing to carry their opinions into politics.

Then, at the insistence of the South, the federal government passed a more drastic fugitive-slave law in 1850. Ohio's delegation in the House of Representatives gave fourteen votes against and only two in favor of this legislation, while Senator Chase opposed the bill in the Senate.[1] The law, as passed, provided no method of determining the rights of the negro who was claimed as a fugitive. It gave the master the power of an officer of the law in a state where he was not a citizen, and was harsh and repugnant to feelings of justice and humanity. The act imposed a heavy penalty for aiding fugitives and commanded all good citi-

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[1] *Cf. House Journal*, September 12, 1850, pp. 1451–1452.

zens to assist in returning slaves. The federal officers were entrusted with its execution. The law called forth a storm of indignation in the North.

Ohio became at once a scene of action for slave-hunters supported by federal authority.[1] A conflict between state and federal officers resulted, leading in some cases to acts of violence.[2] Joshua R. Giddings, the staunch friend of the slave, denounced the law saying, "The freemen of Ohio will never turn out to chase the panting fugitive." [3] Petitions were sent to Congress asking for the repeal of the law. Meetings were held to protest against its injustice and inhumanity.

The commonwealth resented this invasion of rights which were considered to belong especially to the State. With the conflict, grew the sentiment against an institution which endangered the liberties of Ohio citizens and stirred up friction between neighboring states. Southern Ohio, which had been so favorable at one time to the interests of the South, and so opposed to abolition, now was moved by a feeling of state pride, and incensed at the arrogance of the southern pro-slavery leaders.

After 1850 the Democratic party sought to become a unit on a pro-slavery basis. The Whig compromise of 1850 had brought that party into utter disrepute in Ohio. In 1851 the Democrats carried the state because of the many disunited factions of the opposition. The Kansas-Nebraska Bill was passed in 1854 at a critical moment. The Ohio delegation cast only four votes in favor of it and these

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[1] *Cf. Victims of the Fugitive Slave Act of 1850*, published by The American Anti-Slavery Society, 1861, for cases in Ohio.

[2] *Cf.* William H. Smith, *A Political History of Slavery*, 2 vols. (1903), vol. i, pp. 205 *et seq.* This gives an account of the "Greene County Rescue Case" which occurred in 1857, and set Ohio aflame.

[3] Siebert, *op. cit.*, p. 315.

members were promptly defeated at the next elections because of their votes.[1] The bill was carried by the South with the aid of northern Democrats. Ohio had from the first opposed the extension of slavery, and this repeal of the Missouri Compromise aroused intense feeling because it opened the whole question of slavery in the territories once more. The people of the North looked with alarm upon the prospect of nationalizing the institution. So this bill served to unite the factions in Ohio into the new Republican Party which elected Chase governor of the State. He vigorously upheld the sovereignty of the state and the freedom of its citizens against the fugitive-slave law and the arrogance of a slave-holding aristocracy.

Summary.—From the material just presented, it appears that there was a desire on the part of some, from selfish and political motives, to introduce slavery into the Territory, but the majority of the settlers were determined to be free from the institution of human bondage. They were equally determined to prevent free negroes from being attracted into the State. Toward those already present they adopted a harsh policy because of their contempt for the generally shiftless character of the black, and because they wished to be free from the economic burden of supporting an increasing population of this character.

There were many in the State who from the first opposed slavery. These opponents expressed themselves through the church, the local anti-slavery society, the press, and colonization schemes. These early movements came from the South itself or from the border states where the situation was most familiar. It has been pointed out that the early leaders in these anti-slavery efforts in southern Ohio came from the South or from the border states.

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[1] *Cf. House Journals*, May 22, 1854.

When the economic interest of the South in slavery grew stronger and it became more intolerant, abolition sentiment became more radical and bold and the anti-slavery movement became better organized to meet the pressure of opposition. Slaves were escaping and were being aided by friends in Ohio. The South was becoming exasperated while the North was anxious for the Union.

The economic and social interests of southern Ohio were closely connected with the South from which so large a part of the settlers had come. It was therefore natural that pressure was used to suppress abolition in Ohio, even by persecution and the use of mob violence. The state legislature, the church assemblies, public meetings, and the press denounced the abolitionists and declared in favor of leaving the method of dealing with slavery to the states where it existed. Notwithstanding this social pressure within the state, the anti-slavery movement grew.

The South, in order to retain slavery, became more bold and aggressive. The slave-hunters endangered the personal freedom of Ohio citizens, while the slaveholders demanded a more stringent national law which was abhorrent to feelings of justice and humanity. Finally state pride asserted itself against the pressure from outside, and the factions within the state were united in their desire to stay the extension of slavery.

CHAPTER V

EARLY RELIGIOUS INFLUENCES IN SOUTHERN OHIO

Introduction.—The movement toward toleration and religious freedom came from Pennsylvania and the South, not from New England. Early persecution in most of the older colonies drove dissenters to the frontiers. Jefferson, during the same year in which the colonies declared their political independence, became the successful champion of separation of church and state in Virginia.

The individualistic spirit of the border, as it extended westward, gave rise to an increasing number of sects. The radicals who sought freedom from the restraints exercised over their beliefs by the older societies were attracted to the regions where social coercion was at a minimum.

Long before the settlement of the Northwest Territory three great pioneer, dissenting denominations, Methodists, Presbyterians, and Baptists, were spreading in the regions from which Ohio's population so largely came. The beliefs and the organization of these churches were especially adapted to the frontier society within which they became a powerful influence.

Entrance of Religious Societies into Ohio.— When the first settlement was made at Marietta the Ohio Company provided for religious instruction, and Rev. Daniel Story, a native of Boston, was employed to " preach three Sundays at Marietta, two at Belpre and Waterford, in rotation."[1]

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[1] *Cf.* S. P. Hildreth, *Pioneer History*, p. 259.

The solidarity of these New England settlements in all matters concerning the welfare of the community was in marked contrast to other regions of the state, settled by a population with different traditions. The first church in Marietta was of course Congregational, with thirty of its thirty-one members from churches of that denomination in New England. Other sects did not thrive in the community for several years.[1]

The Presbyterian denomination entered Ohio from Pennsylvania and Kentucky but, whether from one or the other, it represented the same people, largely the Scotch-Irish pioneers. During the summer of 1789 at the Cincinnati settlement services were held in the open air or at log cabins. The next year Rev. David Rice from Kentucky organized a church and later installed James Kemper of Transylvania University, Lexington, Kentucky as the first pastor.[2] A large number of the early settlers at Chillicothe on the Virginia military lands were adherents of the Presbyterian church. At the same time, the Scotch-Irish from western Pennsylvania and Virginia were crossing the Ohio into territory where this church was already established. In 1799 a separate presbytery, called Washington, was established. This included northern Kentucky and the churches north of the Ohio River.[3]

The first Methodist preacher in Ohio, George Callahan, came to the territory from his Virginia circuit in 1787. In the southwestern part of the state Francis Clark, a pioneer of Methodism from Danville, Kentucky, began the work. In 1795 James Smith from Virginia crossed into

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[1] *Cf.* T. J. Summers, *History of Marietta*, pp. 198 *et seq.*

[2] *Cf.* W. H. Venable, *Beginnings of Literary Culture in the Ohio Valley*, p. 204.

[3] *Cf.* Robert Davidson, *History of the Presbyterian Church in Kentucky*, p. 128.

Ohio to continue his ministry.[1] In 1798 the presiding elder of the Kentucky circuit was directed to establish a regular Ohio circuit in the southwestern part of the state along the Miamis. During the next year this was done. A society was formed near Milford in Clermont county. Here developed a center of Methodism in southern Ohio. The circuit extended north to Hamilton and Dayton. The next year Methodism was introduced at Marietta and at Waterford in the valley of the Muskingum, by Rev. Robert Manly. In 1800 the Scioto Valley was visited by Rev. Henry Smith from Kentucky, and, during the next year, a society was organized at Chillicothe. It is interesting to observe how the itinerant preachers followed in the wake of the settlers as they pushed up the river valleys from the Ohio into the isolated interior. At the close of the century Methodist churches had been organized at Marietta, Steubenville, Zanesville, Athens, Chillicothe, West Union, and Cincinnati. Other societies rapidly followed until at the first conference on Ohio soil, held at Chillicothe in 1807, there were reported seventeen preachers and 3,883 members.[2]

The Baptists also were represented among the first settlers in southwestern Ohio, at Columbia near the site of Cincinnati. In 1797 the Miami Association was formed, consisting of four churches.[3]

The Moravians had come to Ohio as missionaries among the Indians long before the country was opened for permanent settlement. The Germans entered the territory in large numbers from Pennsylvania after settlement began and we find the German sects rapidly increasing.

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[1] *Cf.* "Introduction of Methodism in Ohio," *Ohio Archaeological and Historical Society Publications*, vol. x, pp. 180 *et seq.*

[2] *Cf.* Bangs, *History of the Methodist Episcopal Church*, vol. ii, p. 79.

[3] *Cf.* Newman, *The Baptist Churches in the United States*, pp. 338, 339.

The frontier owed much to the fearless and earnest circuit rider who plunged into the wilderness, and followed the settlers in order to preserve and elevate social and moral standards among a population in which many members were careless and indifferent, and some were extremely vicious and irreligious. As they passed from settlement to settlement on the outposts of civilization, these devoted men brought new knowledge to the people and took care that they should not forget their God.

The Kentucky Revival of 1800 and its Effects.—The revival in Kentucky occurred among a population, predominantly Scotch-Irish.[1] Selection had made prominent the motor type upon the frontier. The new environment exercised a powerful influence. Neither conventionality nor law exercised the usual control over conduct. The settler must be quick to respond to the needs of the moment and alert against the cruel savage or the beast of prey. He lived amid dangerous surroundings and fear was an ever present, disturbing factor in his mental life. He became careless of personal danger that he could measure, or of a foe that he could meet face to face on equal terms of combat.

Among such a people came the vigorous frontier preacher with his doctrines of a future life and a vividly pictured punishment for the wicked. The adversary, the Devil, could neither be seen, nor met in open combat. Strange phenomena appeared as a result of the preaching. The people were not so good that fervid exhortation could not arouse in them a feeling that perhaps a doom did await them, the more to be dreaded because they could not understand or see it.

They knew very well the dangers to which they were

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[1] *Cf.* Frederick M. Davenport, *Primitive Traits in Religious Revivals*, p. 60.

daily subjected,—perhaps they were plunging blindly ahead into something far worse. Amid the dangers and uncertainties of the frontier life the appeal to their emotions and faith was powerful. The phenomena of the revival only showed how close was the relation between economic and social conditions, and the religious life of a people.

The revival started in a region where the Presbyterians were most numerous. The settlers in Logan county had come mainly from Virginia and the Carolinas. Rev. James McGready, from North Carolina, became the pastor of three small societies in the county in 1796. He declared God as an avenger, and painted hell in lurid colors, exhorting men to escape the wrath to come.[1]

Logan county had been called "Rogues Harbor," because it had become a refuge for many of doubtful character who gathered there to escape the penalties of their wrongdoing. "Regulators" were sometimes necessary to keep order in the community. Even among the law-abiding there was much irreligion and vice.

The effect of McGready's preaching was tremendous. Men began to be anxious and to talk together about the welfare of their souls. Crowds gathered from far and near. During the summer of 1799 the two McGee brothers, one a Presbyterian, the other a Methodist, were on their way to Ohio to preach. They stopped at one of McGready's services, and at this meeting began the great revival movement.

Soon afterwards Elder Stone of Bourbon county came to observe, and carried the revival spirit back with him to the Cane Ridge country. From these centers the epidemic spread rapidly over northern Kentucky and southern Ohio. People came scores of miles in covered wagons and the

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[1] *Cf.* Davenport, *op. cit.*, pp. 66, 67.

crowd spent days in singing, praying and listening to the emotional exhortations. Thus the camp-meeting originated, a form of religious meeting henceforth to hold a very important place, especially in the Methodist churches. It was well adapted to the scattered frontier population and became a social as well as a religious agency. The religious fervor spread by contact and imitation, until the usual vocations of the people were neglected that they might attend these centers of emotional and muscular expression. The people were isolated for days in the wilderness after hearing the impassioned appeals of the preachers. Then they came together again in large crowds in a temper susceptible to great excitement.

The climax was reached in the great meeting at Cane Ridge at which 20,000 were said to have been present. Terrific enthusiasm, physical exhibitions, and ungoverned emotion ruled the gathering. They remained for days under the strain. Many were physically and mentally overwhelmed.[1] The superstitions of the people, common to the frontier, and their belief in signs and omens made these phenomena all the more significant to them and filled them with awe and terror.

Many of the preachers opposed the worst forms of excesses. They sought to elevate new standards of conduct and living out of the emotional awakening.[2]

The immediate effect of the revival upon the denominations, above described, is interesting. There was a great awakening among the Baptists of Kentucky and the mem-

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[1] These excesses are familiar to most. For further account, *cf.* Davenport, *op. cit.*, chap. vi.

[2] *Cf.* L. W. Bacon, *A History of American Christianity*, p. 237. "Neighborhoods noted for their vicious and profligate manners are now as much noted for their piety and good order . . . ," said Rev. David Rice in 1803.

bership was doubled.[1] The Methodist and Baptist churches at once came to the front as important forces in the communities.

Especially within the Presbyterian churches, but embracing the radicals from all, new sects arose as a result of the revival. The great body of the Presbyterian clergy would not sanction the excesses practiced in the meetings, and looked with disfavor upon the disregard of old church doctrines. Parties at once developed, known as revival and anti-revival.

The leaders of the revival idea formed the "New Lights," followed by the emotional religious devotees. Charges were made against the promoters of this movement by the parent church. These were followed in 1803 by the formation of a distinct presbytery to include the dissenters, and prompt expulsion from the old church. The suspended ministers attracted great crowds, pamphlets were published in defense and exposition of doctrines, and the excitement continued. Before the close of 1804 societies of "New Lights" had been organized, on completely democratic principles, at seven different places in southern Ohio.[2]

The five suspended ministers associated under the name of the presbytery of Springfield, Ohio. They issued a statement of doctrinal differences, denying the Presbyterian Confession of Faith in many particulars *i. e.* Divine Decrees and Atonement, and declaring that all creeds ought to be abolished. The Bible alone was to be their authority. They finally affirmed the full power of each congregation to act for itself in all matters. This policy was intensely democratic and corresponded to the idea of local self-govern-

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[1] *Cf.* Newman, *Baptist Churches in the United States*, pp. 335, 336.

[2] Turtle Creek, Eagle Creek, Springfield, Orangedale, Salem, Beaver Creek, and Clear Creek. *Cf.* Davidson, *op. cit.*, pp. 194, 195.

ment in civil life, already described as characteristic of the early Ohio settlers. The criticism of antiquated dogmas and the ridicule of current ideas of the Atonement won the admiration of many, and accorded with the natural love of independence and impatience of old restraints. The whole outlook of the frontier was forward not backward, and involved individual opportunity to say and do new things.[1]

The revival epidemic and emotionalism ran riot for a time in southern Ohio. The first large camp-meeting, held north of the Ohio, assembled at Eagle Creek in Adams county, June 5, 1801. It was participated in by both Methodists and Presbyterians and lasted four days. During the Spring of 1802, one of the leading preachers in the Kentucky revival, Richard McNemar, came to Warren county, and by fervent exhortation aroused great interest. The meetings were large, were often held in the open air, and caused the same kind of physical and emotional excesses that had appeared in the Kentucky gatherings. The lack of self-control, as described by Cartwright, an eye-witness, was remarkable. Visions, prophecies and revelations were the spiritual phenomena.[2] The movement affected most of the Presbyterian churches of southwestern Ohio.

As a result of the revival there was another division within the Presbyterian ranks. The members in southwestern Kentucky where the revival started organized the Cumberland presbytery. The interest was active and more preachers were soon needed. Contrary to the rules of discipline of the church it admitted and ordained even

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[1] For the pamphlet of Rev. Stone on the Atonement, etc., *cf.* Davidson, *op. cit.*, p. 204. Stone's followers were called "Stoneites" or "Christians." *Cf.* W. H. Venable, *op. cit.*, p. 208.

[2] *Cf. History of Warren County*, Chicago, 1882, pp. 267 *et seq.*

ignorant and illiterate laymen. A Methodist preacher was also permitted to preach without requiring any change of doctrine. This was a very liberal and democratic adaptation of old rules to new needs.[1]

The radicals were at once investigated by a commission of the Synod of Kentucky. Against the members of this commission who came to the center of trouble to gather evidence, ridicule and violent prejudice were shown. The people accused the commission of wishing to cut off circuit riders because they did not know Latin and Greek. The new presbytery defended itself, asserting the fallibility of the Confession of Faith and its disbelief in parts of it. It further claimed the exclusive right to examine and license preachers, regardless of Synod.[2] Here again appear the ideas of self-government, working out through the church discipline.

The commission finally suspended the Methodist exhorter, with twenty-four others, and summoned certain of the leading ministers to trial for heresy. The matter was fought out in Synod and Assembly with the result that in 1810 an idependent church was formed by the dissenters, called the Cumberland Presbyterian. This sect adopted a brief and liberal constitution. Within three years it had organized a synod with sixty congregations.[3]

The developments just described are significant examples of the dynamic effect of the West upon religious ideas, as well as upon political principles. In fact the individualism, so characteristic of the early settlers on the frontier, worked itself out in new congenial societies of religious faith. Representatives of new creeds and *isms* went about the country proclaiming with freedom what they held to be true, and op-

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[1] *Cf.* Davidson, *op. cit.*, pp. 228 *et seq.* [2] *Cf. ibid.*, pp. 236, 237.

[3] *Cf. ibid.*, pp. 243-255.

posing what they considered false. Periodicals were established for the defense and propagation of various beliefs.

A significance attaches to these revivals of Kentucky and southern Ohio, however, broader than their religious interest. Professor Shaler estimates that perhaps one-half the people of Kentucky were, by the great religious revival, "brought under the influence of an enthusiasm that for a moment took them quite away from material things."[1] These impulsive, unreasoned, and purely emotional manifestations of religion cultivated dangerous habits of impulsive social action in reference to other matters entirely outside the sphere of religion. The people, who had allowed themselves to be governed so completely by their feelings, could scarcely fail to be affected in like manner under the strain of other exciting causes. They became accustomed to being swayed in large masses by impulse, instead of reason. Professor Davenport describes how Kentucky has always been subject to such action in politics and in the administration of justice, as well as in religion. Of the 156 lynchings in the state from 1882 to 1903, he finds the largest per cent in the counties where the revival fever was most serious. In Logan county, where the revival began, there occurred one-eleventh of the lynchings in the state for that period, whereas the county had only one-eightieth of the state's population.[2]

We cannot trace lynchings in Ohio to any such causes since the number for the same period was very small and not confined to any one section of the state, nevertheless we may justly attribute much irrational and impulsive social action in southern Ohio to the influence of religious enthusiasm upon habits of conduct and control.

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[1] *Cf.* Venable, *op. cit.*, p. 207.

[2] *Cf.* Davenport, *op. cit.*, pp. 302, 303.

The campaign in Ohio to elect the members of the constitutional convention in 1802 was marked by much bitterness between the opposing factions. Mass meetings were held and fiery speeches were made on both sides, especially at Cincinnati where both parties were strongly represented.[1]

We have already recited in previous pages how mob violence against the person of the governor was narrowly averted during the last meeting of the territorial legislature at Chillicothe, the center of the pro-state party. This inpulsive action on the part of the Chillicotheans, led by a prominent member of the legislature, was excited by an act of the legislature removing the seat of government to Cincinnati, and by another act looking toward a division of the Territory at the Scioto river. The mob was soon suppressed but it illustrates how prone the people were to take matters into their own hands.

In the annals of Adams county, along the Ohio River, there is recorded an instance of mass action exemplifying emotional conduct of a different sort. The first notably large assemblage in the history of the county took place in 1808 at West Union, on the occasion of the execution of a famous criminal, David Beckett. The people came in wagons and on foot from the entire surrounding region and even from Kentucky. The multitude was estimated at 15,000. It had been reported that the famous frontier preacher, Lorenzo Dow, would try his powers on the doomed man to secure from him a confession of guilt. Backwoodsmen, boatmen, traders, professional men, women, and children surged about the place of execution. A rough platform had been erected. The pastor of the West Union Presbyterian church preached a sermon to the crowd from

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[1] *Cf.* W. H. Smith, *St. Clair Papers*, vol. i, p. 239; vol. ii, pp. 588–590; also *cf.* Burnet, *Notes*, p. 347.

the platform. Dow followed with another address and finally the prisoner himself was influenced to make a confession and deliver an exhortation to the young people present, warning them to avoid the paths of vice.[1]

The violent prejudices, arising out of the abolition excitement along the Ohio during the thirties, expressed themselves in irrational and impulsive action. Cincinnati was the scene of more than one mob and the press constantly encouraged such conduct. How Birney's property was destroyed by violence and how free speech was suppressed by the pressure of mass action have been described. The factions within the city entered into a bitter struggle. The press was violent and explosive in its utterances because the people were capable of being stirred not so much by reason as by prejudice. Likewise in other parts of southern Ohio, which had become battle grounds for opposing forces, mob violence was not uncommon.

The traits of the camp-meeting were also shown in the political campaigns of this period. The campaign of 1840 was especially one of emotional politics. "The summer and fall of 1840 were spent in a gigantic and continuous frolic." Sound discussion took a secondary place. Harrison was ridiculed for his plain living, and the cry of "log cabin" and "hard cider" was taken up by the Whigs. The meetings in southern Ohio were immense. It is estimated that 100,000 were present at the convention of Whigs at Dayton. Great processions marked the opening of the meeting. In these each county delegation sought to outdo its rivals in display. Harrison spoke to 50,000 at Chillicothe and the meetings seemed to take the form of an emotional hero-worship of the people's idol. The meetings sometimes lasted for days, if speakers could be supplied to

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[1] *Cf.* Evans and Stivers, *History of Adams County*, pp. 391 *et seq.*

entertain the crowds.[1] In this and other campaigns of this type personal preference or prejudice, rather than independent thought, evidently decided the issue.

Many other cases might be cited, but enough has been said to indicate the direction in which the habit of unreasoned, impulsive action by masses of people may lead. It is not claimed, by any means, that all such action in southern Ohio and Kentucky has been due to the influence of the religious frenzy shown in the revivals and the consequent weakening of individual self-control, but it is intended to point out that such influences as prevailed in the revivals do contribute to rash social conduct in many other lines not directly connected with religion.

Further Developments Within the State.—At the meetings in Kentucky many of the young preachers, who afterwards came to Ohio to work, received their enthusiasm. After the "New Light" separation, the orthodox Presbyterian church in Ohio gradually recovered its influence and spread rapidly through the State. In 1814 the Synod of Ohio was organized, consisting of three Presbyteries,—Washington, Lancaster, and Miami. In 1837 within the State were 304 ministers, 477 churches and about 34,000 communicants, in spite of the fact that the "New Light" sect had drawn somewhat from their membership.[2]

The strength of the Methodist Episcopal church in Ohio was almost double that of the Presbyterian. From the time of the revival it had come to the front as the leading denomination in the State.[3] This church made use of the circuit rider and the camp-meeting to reach widely scattered settlers or draw them to a central meeting place. The

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[1] *Cf.* D. J. Ryan, *History of Ohio*, pp. 132-135.

[2] *Cf.* Caleb Atwater, *History of Ohio*, pp. 306, 307.

[3] *Cf. ibid.*, p. 307. Members, 77,036; traveling and local preachers, 854; churches, 490; circuits, 139.

camp-meeting became an established institution of Methodism and a very important socializing agency. The excesses characteristic of the Kentucky revival gatherings were largely eliminated. These meetings were genuine, if only temporary, congenial societies. Thus the Methodist church was best fitted in its organization to meet the needs of the pioneers.

The country church in early Ohio became a social center and the minister, passing on his circuit from one community to another, served as a general clearing house of information and a bond of relation between widely isolated groups.

In 1830 a significant division in the Methodist church of the country had taken place. During this year the Protestant sect separated from the parent church. For several years preceding there had been agitation on questions of government and doctrine. A party of reformers had been working within the church to bring about certain changes in organization. When the separation had been effected the Protestant division adopted a new constitution and decided that the General Conference should consist of an equal number of ministers and laymen elected by the annual conferences. The offices of bishop and presiding elder were abolished. The idea of episcopacy was thus abandoned and laymen were admitted to a part in the legislative and judicial departments of the church government.[1] In Ohio also we find this same division, reflecting in the church the democratic political ideas of the times.

There had also occurred a break in the ranks of the Baptists. As a natural development of the spirit that led to the "New Light" separation, and with much the same ideas, a new sect appeared, led by Alexander

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[1] *Cf.* Nathan Bangs, *op. cit.*, vól. iii, pp. 434-436.

Campbell. This leader at one time belonged to the Presbyterian church in Virginia, but had renounced this denomination in 1812 and joined the Baptist Association of Redstone.[1] Campbell was captivated by the liberal, anti-sectarian views popular on the frontier at that time. He proposed to restore the spirit and letter of primitive Christianity. Challenging the whole theological field to debate, he issued printed material from his own press in great quantities.[2] In 1823 he openly raised the standard for a new sect, and published the "Christian Baptist" as a medium for the expression of his beliefs. The next year he writes, "We advocate New Testamentism."[3] In 1827 the orthodox Baptists disowned the new sect and as a result much agitation and a division occurred in that church. The followers of Campbell formed new societies and the sect rapidly spread over Virginia, Kentucky, and Ohio. Within twenty years there were 150,000 members, and from that time on the church has continued to be a strong western denomination.[4] Creeds were discarded. The Bible alone was taken as the standard. Each congregation was organized to be independent of every other. No church officer had authority outside of the congregation that elected him. The denomination finally chose the name "Christians" and the "Stoneites" joined with them.[5] Here was another excellent example of independent self-government asserted in religion, and of the liberalizing of creeds under the influence of the democratic movement.

Campbell was a great debater, and in 1829 at Cincinnati he entered into prolonged discussion with the great social reformer, Robert Owen, who denied the truth of religion. For eight days they debated before a large gathering of

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[1] *Cf.* Davidson, *op. cit.*, pp. 214, 215.

[2] *Cf.* Venable, *op. cit.*, p. 220.

[3] *Ibid.*, pp. 208, 209.

[4] *Cf.* Davidson, *op. cit.*, p. 215.

[5] *Cf. ibid.*, pp. 216, 217.

people from many states.[1] Cincinnati had become the great center of discussion in the Ohio Valley and Campbell, on frequent occasions, took the platform in defense of his ideas against Catholics, Universalists, and Calvinists. These discussions were productive of good to the people, and showed how every man was allowed freedom of speech on religious matters.

At the close of the preceding century Unitarianism was to be found in Kentucky, but not until 1819 was it introduced into the great center of learning at Transylvania University. During this year Dr. Holley, a Yale graduate, became president of the school but the discussion of theology which followed ended in his resignation. Many champions of his beliefs appeared in Cincinnati where a Universalist periodical was started in 1829.[2]

It was not until 1832 that Dr. Lyman Beecher came to Cincinnati, as president of Lane Seminary. He represented the rationalism of the new school of New England theology and at once came into opposition to the old doctrines of Scotch Calvinism in the Presbyterian church. His orthodoxy was questioned but he was acquitted.[3] This liberal tendency in the system of doctrine was destined to result in the division within the Presbyterian ranks, known, after 1837, as Old and New School. The Old School was more conservative. It relied more on the support of the South, and was therefore more inclined to compromise with slavery and to oppose abolition.[4] This division was evident in southern Ohio.

In 1846 Cincinnati had over twenty-five different sects and divisions among her seventy-six churches. The Methodist churches far outnumbered all others and the Presbyterian

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[1] *Cf.* Venable, *op. cit.*, pp. 221, 222.

[2] *Cf. ibid.*, pp. 208, 209.

[3] *Cf. ibid.*, pp. 218, 219.

[4] *Cf.* L. W. Bacon, *A History of American Christianity*, pp. 294-297.

and Baptist denominations came next. The followers of Campbell, "Christians," were well represented, as we should anticipate from the account given of their origin and leader. The Germans, from both Pennsylvania and Europe, had settled in the city in large numbers. We, therefore, find eight German Lutheran and Reformed churches in Cincinnati. Eight Catholic churches represented the large Irish and German population. These facts show the great variety of religious belief entertained and tolerated in the metropolis of the Ohio Valley.[1]

Out of the "clash of creeds" and the action and reaction of divergent beliefs, much real truth was evolved. The intellects of men, put in the background at the time of the great revival, again asserted themselves in theological and social discussions. The churches increased their membership, and the leading sects published their own periodicals in defense of their ideas. Platform and debate were used to express the opinions of leaders. Currents of experience and beliefs met in the city, and from their interaction there evolved much to promote progress in western society.

A further examination of the county historical collections, above cited in the case of Cincinnati, shows that in each of the largest towns of the State in 1846 there were from five to fourteen different sects, with a decided predominance of Methodist, Presbyterian, Baptist, and German churches.[2] The degree of religious toleration, born of the democratic ideas of Ohio pioneer society, is clearly indicated by these statistics.

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[1] *Cf.* Henry Howe, *Historical Collections of Ohio* (1847), p. 218. Also *cf.* *Cincinnati Miscellany*, 1845, pp. 81, 82.

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Dayton	15 churches	12 different sects.
Columbus	17 churches	14 different sects.
Zanesville	14 churches	9 different sects.
Chillicothe	13 churches	11 different sects.

—*Cf.* Howe, *op. cit.*

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

In 1850 the United States Census presented very imperfect statistics relating to the number of church buildings belonging to the various denominations in each county. Nevertheless they serve as a guide in estimating the comparative strength and location of the various sects.

The Congregational church was shown to be confined practically to the counties in the northeastern part of the state and to Washington county where the New England settlers were most numerous.

The Dutch and German churches were most numerous in those southern and central counties where the Germans from Pennsylvania and Europe had largely settled.[1]

Most of the Quakers were found in the southern part of the State, as was indicated in a previous chapter. The "Christians" had ninety churches, mostly in southern Ohio.

Of course by far the most numerous were the churches of those denominations whose history we have followed somewhat in detail in the previous pages. The Methodists were far in advance of the others with 1,529 churches. The Presbyterians had 663 and the Baptists 551. A survey of these three denominations by counties reveals the fact that they were widely distributed. They flourished in practically every county of the State in 1850.

The number of Methodist churches in the different counties varied from one to fifty-two. The largest number had been organized in Muskingum in the southeastern part of the state. If we take the counties having twenty or more churches of this denomination, it appears that, of the thirty such counties, all except seven were located in the southern

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[1] The German Reformed had 71 churches; the Lutherans 260; and the Moravians 160. The combined strength of these was almost as great as that of the Baptists. These churches were found chiefly in Carroll, Columbiana, Coshocton, Crawford, Fairfield, Hamilton, Holmes, Mahoning, Montgomery, Perry, Pickaway, Pike, Preble, Richland, Muskingum, Seneca, Stark, Tuscarawas, and Wayne counties.

part of the state, and that these seven were situated in the eastern-central portion in the path of the westward-moving population from Pennsylvania and Virginia. All except one of the nine counties with the largest number were located in the southern part of the state.

Of the twenty-seven counties having ten or more Presbyterian churches each, fifteen were located in the southern part of the state and most of the others in the east-central portion. Of the counties returning the greatest number of Baptist churches only about one-half were situated in the southern part of the state.[1]

Not only did the multiplication of churches of different sects in the little frontier towns have important social consequences for the particular community, but the diffusion of the three large denominations throughout all the counties served to make the state more of a unit. People gathered from the entire area at large church assemblies and thus became better acquainted with each other and with the different parts of the state. The interests of religion gave a point of intellectual contact and formed a common basis for larger than merely local groups.

It now more clearly appears why there occurred that change in the attitude of the large religious denominations toward slavery, which was discussed in a previous chapter. The large membership, in both North and South, led to a policy of compromise and suppression of agitation, just as a similar cause produced similar results in the old political parties. Southern Ohio, where these churches were most numerous and where opinions and sympathies were most divided, was naturally the scene of that conflict within the denominations which finally resulted in divisions, North and South, on the slavery question.

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[1] *Cf. Statistics of the United States—Census 1850*, table xiv, for the basis of the above statements.

CHAPTER VI

EARLY SOCIAL LIFE AND EDUCATION IN OHIO

Frontier Social and Anti-Social Conduct as Shown in Ohio.—In the early population the social bonds were the approbation of the community and a common purpose to subdue the new environment. Common dangers from which all must be protected and common needs drew the people together. Since men came from widely separated places, there was necessarily much toleration of different customs and beliefs, but when someone, more daring than the rest, passed the limit he was disposed of by exclusion. Summary methods of justice were often employed in preference to the more orderly process of law.

Many neighborhoods became a refuge for criminals and outcasts from the older society. There was much rowdyism and fighting along the Ohio. The life of the boatmen was rough and dangerous and hard conditions produced a reckless and dissipated class of men.[1] It is not surprising, therefore, to find at a very early date the organization of the "Regulators" to keep order in some Kentucky communities. This same method was employed more commonly in Indiana than in Ohio but was not uncommon in the latter state. When the usual legal means were not deemed sufficient, the settlers were accustomed to rely on their powers to deal with the offenders directly. They formed themselves into a company "whose duty it was to

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[1] *Cf.* A. B. Hulbert, *The Ohio River*, chap. x.

purge the community of its unruly members."[1] As early as 1782 the Virginia legislature had declared that circumstances may arise justifying extra-legal measures on account of the danger to the peace of society.[2] This expresses very well the view of the self-confident frontier society and was resorted to at various times in the early history of Ohio.[3]

An Adams county pioneer, Rev. J. B. Finley, declared, "No man was permitted to insult another without resentment; and if an insult was permitted to pass unavenged, the insulted party lost standing in society."[4] Such a code of personal honor did not promote self-control and public opinion in many communities opposed it. Confidence in ability to take care of one's own interests and reputation was characteristic of the frontier. Even the camp-meetings were not free from personal encounters, and public gatherings often ended by settling differences in combat, especially when political enthusiasm ran high.[5] The early militia musters gave opportunity for the exhibition of personal prowess. The taverns along the stage routes, where all sorts of people met, were scenes of many disturbances.

This contentious spirit was well illustrated at a Fourth

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[1] *Cf.* J. E. Cutler, *Lynch Law* (1905), pp. 78-81.

[2] *Cf. ibid.*, p. 89.

[3] *Cf.* D. M. Massie, *Life of Nathaniel Massie*, p. 57. This account gives the method of executing justice at Manchester, Ohio. *Cf.* B. S. Youngs, *Transactions of the Ohio Mob-Expedition against Shakers*. This occurred in Warren county, near Lebanon, in 1810, as a demonstration of feeling against the methods of the communal group known as "Shakers," a sect that resulted from the Kentucky revival. We have already cited several examples of mob rule in the abolition excitement in Cincinnati as well as in resistance to the Fugitive Slave Law.

[4] Evans and Stivers, *History of Adams County*, p. 57.

[5] *Cf.* C. A. Hanna, *Historical Collections of Harrison County*, p. 65, for specific instances.

of July celebration in Lancaster, Fairfield county. The town was located on Zane's road, the chief early highway between Pennsylvania and Kentucky. When the celebration was at its height a stranger on his way to settle at Chillicothe appeared. Attempts to persuade him to stop at Lancaster were made. He, however, boasted of the superior merits of Chillicothe. A challenge to settle the matter by combat followed, and a man was selected from the Lancaster group to fight. A ring was formed, the fight was waged, and the stranger lost.[1]

Along the Ohio River the Yankee appeared in marked contrast to the Southerner. The former was more orderly and law-abiding, keen in business, devoted to the accustomed ways of thinking and doing things so far as these were compatible with his new surroundings. The settlers from Pennsylvania and the South were more independent, combative in temper, generous in spirit and democratic in point of view.

The great majority of the early settlers came into the Northwest Territory to find a better chance, to form a commonwealth based upon a large degree of equality and freedom, and to develop industries which should prove profitable to all. The land was fertile and the one sure way to prosperity was to promote and practice the virtues of industy and thrift. In such an environment these characteristics became strongly marked and were highly esteemed by society. Men, for the most part, were on about the same

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[1] *Cf. Stimson Collection*, Marietta Library, vol. ii, pp. 46-52. Also *cf.* T. Ashe, *Account of Travels in America in 1806* (1811), letter xxi, pp. 191 *et seq*. This writer gives a description of Lexington, Kentucky, in 1806, in detail. On certain days the town gave itself up to practices that, in his opinion, would identify the people with untutored savages. He describes the drinking, gambling, and fighting which often interrupted the regular business of the town.

economic level, there were no distinct class divisions, and, in the absence of any considerable amount of capital, there soon developed much local coöperation. The settlers aided each other at the house-raising, the planting, and the harvesting.

Certain individualistic tendencies have already been pointed out, which were often opposed to the interests of the group. Many were reluctant to give up the cherished right to be their own jury and to inflict their own penalties. Many vices developed under conditions that allowed a large degree of freedom to the individual.

An examination of the statutes of the first quarter-century of Ohio's history shows that such conditions as have been suggested did exist, and to a degree which merited the attention of territorial and state legislatures. It becomes evident also that the majority, realizing the real and possible effects of recklessness, idleness, and intemperance, was demanding from its representatives some action to promote the real interests of the community and the state by legal means instead of by extra-legal action. A great variety of offenses accordingly were defined and penalties were affixed by statute.

Under the régime of the territorial government, when the governor and judges constituted the legislature, a law was adopted from the Virginia code in 1795, to suppress gambling. The law embraced all sorts of gambling, by cards, dice, etc., and betting at cock-fights, horse-races and other sports. Heavy fines were imposed and licenses were taken away from tavern keepers who violated the statute.[1]

In 1798 a law was adopted from the Kentucky code intended to control men of wild habits who engaged in continual fighting. The law prohibited maiming by cutting

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[1] *Cf. Laws of Northwest Territory, Maxwell's Code* (1796), pp. 206 *et seq.*

out the tongue, or putting out the eye, or biting the nose or ear of the opponent. The penalty was one to six months in prison and a fine of $50 to $1,000. In want of means of payment the offender might be sold to service by the court for a period not exceeding five years.[1] In these laws is evident the purpose of the governor and judges to control the personal conduct of men so far at least as it tended to become injurious to the peace and prosperity of the community as a whole. How well they succeeded may not be ascertained with any accuracy, but such attempts to control are significant of frontier conditions. It is noteworthy also that, whereas most of the laws of the territory were adopted from Pennsylvania, those cited above in regard to personal conduct were adopted from southern frontier states which had had more experience of the need of such regulation.

Under statehood the commonwealth continued to enact similar laws. In 1805 the legislature passed a severe law against duelling, with a penalty of $2000 fine attached, as well as sureties for good behavior. The penalty also included exclusion from holding office or exercising the franchise in the future. If the fine was not paid the offender must serve ten years in prison.[2]

In 1814 severe laws were again enacted against gambling at horse-races and cock-fights. Importers of playing cards were punished and playing at taverns and public places was forbidden.[3] In the southern part of the State sporting centers had early developed in the towns, especially at Cincinnati, Hamilton, and Lancaster. Racing was a sport especially promoted by the southern settlers and a law had

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[1] *Cf. Laws of Northwest Territory*, 1798, published at Cincinnati. pp. 7, 8.

[2] *Cf.* S. P. Chase, *Statutes of Ohio* (1833), vol. i, p. 441.

[3] *Cf. ibid.*, vol. ii, pp. 823–825.

been early adopted from the Kentucky code to improve the breed of horses.[1] The Hamilton Common attracted the people for miles to witness the sports and engage in social enjoyments.

Even as late as 1821, the law against maiming the person of an opponent was reënacted, essentially as before quoted, but with a much severer penalty, namely, three to twenty years at hard labor.[2] In 1825 a law was passed prohibiting bull-baiting and cock-fighting, on the ground that these public sports collected idle spectators, produced drunkenness, rioting and vicious habits and tended to corrupt public morals.[3] This last law cited is especially interesting because it gives definite statement to the grounds upon which such restraining laws were based. Social pressure in the community was brought to bear upon those who would not conform to the habits of thrift, self-control, and obedience to rules of conduct, which seemed necessary for the prosperity of the community. This pressure was finally expressed in the form of legal restrictions.

The beginnings and growth of temperance sentiment in the State acquire interest from this point of view. At this early period the use of liquor was very common both at home and at public gatherings. A celebration was never complete without the good cheer represented in the flowing bowl. The tavern promoted excessive drinking. Men were rendered worthless and a menace to the community by prolonged self-indulgence. Intoxication became responsible for much of the social disorder of the time.

The communities manufactured their own liquor supply.

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[1] *Cf. Laws of Northwest Territory*, 1798, pp. 12–14.

[2] *Cf.* Chase, *op. cit.*, vol. ii, p. 1202.

[3] *Cf. ibid.*, vol. ii, p. 1460.

The southern part of the state, especially around Cincinnati and in the southwestern part along the River, produced large quantities for export by boat to southern markets. By this means the bulk of the grain was reduced and the product became more valuable, as long as transportation remained difficult and expensive. This southern trade stimulated the industry more and more. The evils of intemperance, therefore, became more apparent in that part of the State, as was shown in the experience of Chillicothe which was compelled at one time to adopt heroic measures to limit the use of intoxicants.

As early as 1799 the territorial legislature, recognizing that excessive drinking tended to produce paupers, authorized the appointment of guardians for persons who were wasting their estates by excessive use of liquor, gambling, and idleness.[1] The legislature was anxious that such men should not become public charges upon the community and wished to check idleness and to promote industry.

The frontier churches began at an early date to oppose intemperance and personal vices, on moral grounds. The preachers and circuit riders had an important part in forming the ideals of the people in these matters. The West offered to each man an opportunity, but the opportunity could never be realized if the person rendered himself inefficient by intemperate habits. Communities became prosperous in the rich environment, but this prosperity was hindered by the persons who were unable to contribute their share because they had become physically and morally unfit. Such were the religious, moral, and practical views which gradually developed on the problem of intemperance.

When the American Temperance Society was organized,

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[1] *Cf.* Burnet, *Notes*, p. 314.

Ohio soon joined the movement. In 1829 the State had thirty branch societies.[1] In 1846 a large convention, presided over by the governor, met at Columbus. Resolutions were passed condemning the waste of food in the distillation of liquors, and demanding that the people be allowed to vote on the local existence of the traffic.[2]

When the convention to revise the Ohio constitution met in 1850 many interesting matters were discussed, but not the least interesting was the expression of opinion from all parts of the state by petitions, asking the convention to authorize or require the legislature specially to prohibit the traffic in liquors, or restrict it by refusing to legalize the sale. A careful tabulation of these petitions, as they are recorded in the debates of the convention, shows that more than 300, from over 75 per cent of the counties of the State, were received during the session of the convention. Each petition was signed by from one to 1400 persons. Still more significantly, the counties which sent the largest number of petitions, more than seven each, were without exception in the southern part of the State, where the traffic and its evils were most apparent.[3]

The genuineness of the public opinion expressed in these petitions was shown by the report of the committee on retailing ardent spirits. This was a subject which might

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[1] *Cf.* Dawson Burns, *Temperance History*, vol. i, pp. 29, 30. Also *Cf. Fourth Annual Report of American Temperance Society* (1831), p. 28.

[2] *Cf. ibid.*, vol. i, p. 279.

[3] Petitions: Muskingum county, 19; Guernsey county, 15; Belmont county, 15; Morgan county, 13; Warren county, 13; Hamilton county, 11; Brown county, 10; Licking county, 9; Ross county, 9; Clermont county, 9; Preble county, 8; Lawrence county, 8.

well have been left to the discretion of the legislature, but the committee of the convention, appointed to consider the question, recommended that, "No license to traffic in intoxicating liquors shall hereafter be granted in this state, but the General Assembly may by law provide against the evils resulting therefrom." The convention adopted the report by a vote of forty-five yeas to thirty-nine nays.[1] The section as recommended was made a part of Ohio's second constitution.[2]

In spite of the anti-social elements and personal vices, there was forming in Ohio a strong and healthy community life. The struggle with the environment was producing a conscientious, industrious and thoughtful type. Where individualistic tendencies or unsocial conduct became radically opposed to the interests of all, social pressure was exerted to correct the conditions.

Education a Factor in the State's Progress.—It is not our purpose to give a history of education in the State, but only to show the nature of the early ideas on education and how they worked out in practice. Education did not become really a matter of state concern, nor was a system of popular instruction, supported by public taxation, established for a quarter of a century after statehood was attained. Necessarily, the isolation of the scattered settlements long rendered instruction a local and individual matter.

Jefferson's trust in the common people was based on the great confidence he placed in common enlightenment. As early as 1780, the legislature of Virginia passed an act vesting certain escheated lands in Kentucky in trustees, for a

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[1] *Cf. Debates*, vol. ii, pp. 694, 695, for vote.

[2] *Cf. Ohio Constitution, 1851*, art. xv, sec. 9.

public school.[1] Five years later the school opened near Danville at the private house of a Presbyterian minister from Virginia, Rev. David Rice, who organized the first church in Cincinnati a few years later. The preacher often served as the teacher in the schools and thus sought to elevate the intellectual as well as the moral standard of the community. Rice's school continued for nine years under his care, and in the meantime moved to Lexington where it finally became Transylvania University, the first college in the Ohio Valley. The Kentucky legislature provided for twenty-six academies in the various counties of the state and endowed each of them with 6000 acres of land. These were to be the feeders of the great central university. The presidents of Transylvania, during the first half century, were selected from the frontier religious denominations, before described.[2]

The first college in the Northwest was established at Athens in 1804. This institution was endowed with lands granted to the Ohio Company by the national government. The New England settlers, under the leadership of Mr. Cutler, had conceived the idea of making this college the great center of learning in the Territory, as Harvard was in the East. But ideals such as this do not prevail in the face of opposing economic and social conditions, and Athens today is only one of the many small colleges of the State. The parts of the Territory were not yet united by such common interests as would make such a project possible. A single commanding institution of learning was not in accord with those local, individualistic ideas of education which led to diffusion rather than to centralization.

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[1] *Cf.* Venable, *Beginnings of Literary Culture in Ohio Valley*, pp. 162 and 164 for text of act.

[2] *Cf. ibid.*, pp. 162–170.

A like grant had been made by the government to Symmes for the endowment of a college in the southwestern part of the State. This institution, called Miami University, was chartered five years later than that at Athens and was located at Oxford in Butler county. The first president of the college was Robert H. Bishop, a Presbyterian minister and formerly professor in Transylvania [1] an institution from which Ohio drew many other teachers.

Ohio soon became noted for academies and small colleges. Partly because of the isolation and difficult communication of the early days, and partly because of the traditions and experience of the settlers, many academies grew up, as the antecedents of the colleges. Some of these institutions still retain their preparatory departments. The purpose of these academies was to afford an opportunity to the ambitious to fit themselves for leadership and so to spread the desire for learning until secondary and primary schools could be started in every settlement and the system be made really democratic. At least eight colleges were established within the first thirty-five years of Ohio's history and many more academies. Today the colleges number at least thirty and in many cases the religious denominations still exercise much control over particular institutions. The very multiplicity of sects increased the number of colleges and academies.

It is clear that whatever higher education was provided in Ohio during the first years of its history, above the most elementary training given in the home or private school, was largely controlled by religious sects, or by public-spirited men who established private academies. Of course such education was a matter of local concern and there could be no uniformity in the instruction. Whatever unity was

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[1] *Cf.* Venable, *op. cit.*, p. 176.

found came as a result of sectarian education when an institution appealed to its own denomination over a wider area.

Free common-school education, as now understood, was impossible in the pioneer stage. Even today the rural districts are far behind the towns in efficiency. During the first half-century of Ohio's history the only efficient schools were those in the more densely populated communities. This is shown by the progress in improving the city school system made by Cincinnati. The poverty of the settlers, and especially the traditions of the southern interior from which so many came, discouraged extensive expenditure for schools. The taxation of all for the education of those who could avail themselves of the advantages was at first out of the question. The child who desired an education and was willing to struggle hard could get it, but not without an effort akin to that which mastered the physical environment. Most of the education was necessarily of that severely practical nature that made the individual efficient to cope with his environment. Home training was more important than knowledge of books.

Elementary schools were opened, however, in the New England settlements the year following the first arrivals. The directors of the Ohio Company appropriated money for the instruction of the children of Marietta, Belpre, and Waterford. In these communities education became a matter of common interest as it had been in New England.

This attitude was not common to other parts of the State. The first common school opened at Cincinnati was on the subscription plan, and was organized by John Reily who came direct from Lexington, Kentucky.[1] Private schools

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[1] *Cf.* Venable, *Beginnings of Literary Culture in the Ohio Valley*, pp. 184 *et seq.*

were advertised in the Cincinnati paper and instruction was given in blockhouse, church, or cabin. It was usual in starting a school for the applicant to draw up an agreement stating what branches he was able to teach and what compensation he expected. The paper was then circulated for signatures and subscriptions to be paid in money or in produce. The tuition of poor children was sometimes paid by public-spirited men of larger means. Periods of instruction were very short, books were scarce, and there was little system.

The efforts of Congress to promote free common schools in Ohio by the donation of a large amount of land, ($\frac{1}{36}$ part), for the support of the system, at the time when the Territory was opened, were rendered almost futile by the conditions of the sparsely settled frontier and the attitude of the settlers. This grant was made largely through the influence of some of the New England settlers and later it formed the foundation for a thoroughly democratic system of free instruction. But as yet the people were not ready to put in operation such a plan.

The legislature grossly misused its power as trustee of these lands, allowing them to be mismanaged and exploited for private ends. Nearly one-third of the acts of the legislature from 1802 to 1835 pertained to the disposal of these lands, and the end was confusion as well as irreparable public loss.[1] A case is recorded by Atwater where a state senator secured for himself and family seven entire sections.[2] Before 1825 these lands became a burden instead of a source of income to the State, as they should have been if properly administered.

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[1] *Cf.* S. P. Orth, "Administration in Ohio," *Columbia University Studies*, vol. xvi, no. 3, p. 30.

[2] *Cf. History of Ohio*, p. 253.

It was not until 1819 that the attitude of the legislators and their constituents began to change. During this year Mr. Cutler of Marietta began the agitation for a better school system. In 1821 the House appointed a committee on schools and school funds, of which Atwater was chairman. The report of this committee resulted in the appointment by the governor of seven commissioners, one from each of the land districts of the State, to collect material, to report to the next assembly a system of education for common schools, and to consider the best means of administering the fund set apart by Congress for this purpose. Atwater was again chairman and prepared a report which was printed and circulated over the State in 1823. In the fall of this same year, the legislature considered the report and quarreled over the matter during the entire session. A majority in each house still opposed a system of public schools supported by taxation, and objected to the sale of the school lands. Individual and local interests were more apparent than the common need of public instruction.

In the elections of 1824, both school legislation and internal improvements were political issues, and were warmly discussed. As a result large majorities favoring these measures were elected to both houses. On January 28, 1825 the House passed the canal bill, fifty-eight to thirteen; and later, on February 1, it passed a common school bill, forty-six to twenty-four.[1] These votes show that there was more opposition to the school bill than to the construction of canals. This probably means that economic interest was much more apparent in one measure than in the other. That no real public opinion had yet been aroused in support of public education was shown by the fact that for years the new school law had very little effect in increasing the

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[1] *Cf. House Journal*, pp. 318 and 332 for votes.

local efficiency of the schools. The twenty-four negative votes on the school law came from outside the New England settlements, from the sections of the state where traditions would naturally be most opposed to the system.

The bill granted, as we should expect, practically complete local autonomy in school matters, so that the development of a system was a slow process. Unified organization has scarcely yet been achieved. The permission to the locality to levy taxes for the support of public instruction enabled the communities to go forward as fast as public sentiment approved. Ten years later, in 1836, the governor said in his message; " Our system of education is languishing in proportion to our other improvements." At this time no standard of education had yet been established because every locality managed its own affairs and laws passed by the legislature were allowed to go unenforced. The better schools of the State were not free. It was the common practice to continue the instruction free, as long as the state money, distributed according to the valuation of the district not the number of pupils, lasted. Then the school was continued by charging a tuition for further instruction. This plan left the poor children to get on as best they could. The average length of the school session was less than twenty weeks. The local taxing power was rarely used, and the funds derived from the school lands and the State proved wholly inadequate.

The public schools were so poorly managed that private schools continued to hold an important place, and, in many places, multiplied even more rapidly than the public schools. The first superintendent of schools reported in 1837 a little less than one-half as many private as public schools in the entire state.[1] If we compute, from this report, the ratio of

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[1] *Cf. Report of Superintendent of Schools* (1837), gives by counties the number of each.

the private schools to the whole number of schools in each county, we find the largest proportion of private schools outside of the areas occupied by the New England population, and especially large in the southern part of the State and in the sparsely settled western counties. There was also a tendency for the proportion of private schools to decrease in the more densely populated counties, because in these centers wealth was increasing, the people were more progressive, and the common schools became more efficient.

The superintendent had asked the legislature that he be given a centralized control over the entire system, but this was not granted because the law-makers were always reluctant to place much power in one man's hands. The independent office of superintendent lasted for three years only. At the end of this period the demand was successfully made that the duties of this officer be transferred to the secretary of state. Before the office was abolished, however, it had proved its usefulness. The number of schools had been greatly increased and the enrollment had doubled. A state school tax was provided and teachers' institutes were established. Public interest had begun to be aroused, but, after the abolition of the office, both interest and efficiency again rapidly declined.

In his report in 1844, the secretary of state declared, "No other interest of the State has been so fearfully neglected . . . The principal obstacles are the inefficiency of township and district superintendence, the incompetency of teachers, and the absence of action, sympathy and interest on the part of the parents."[1] Here are pointed out the real difficulties and the reason for failure to make public instruction a success.

To sum up the progress of the half-century, it appears

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[1] *Report of the Secretary of State* (1844), p. 5.

that at first schools were matters of local concern entirely and largely private; that there was no state control by a superintendent until 1837, and then for only three years; that the school lands, through gross mismanagement, were entirely inadequate for the purpose intended; that there was no state tax for education until 1839, and no regular system of local taxation at all during that period. During no year were the public schools in session, on an average, more than twenty-two weeks. Usually they were not open so long as that.[1]

Although efforts were made to promote a general system of education by grants of land from the government in each locality, such a plan proved futile in the face of frontier conditions. The State was actively promoting its material prosperity by creating a system of internal waterways and roads, and it left the training of its youth to the localities, each community being left free to choose the method and extent of training according to its own ideas and traditions. The results of isolation and local policy persisted longer in education than in other spheres of activity. Ideals of a unified and well-directed free common-school system for all had to be developed gradually in the minds of the pioneers of Ohio. That a man should be taxed to support an institution of which he made no use, for a long time, seemed out of harmony with frontier ideas. That there was any need of uniformity in the system of education was not perceived by a people not yet deeply conscious of united interests in a great commonwealth. The utility of a system of instruction, provided with adequate funds to bring its advantages to rich and poor alike, did not appear so evident as the utility of improved means of trans-

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[1] *Cf.* Orth, *op. cit.*, p. 74. Here is given a table of statistics upon which the above conclusions are based.

portation and the development of industry, which would give to every man the chance to earn a good living if he was willing to work for it.

There were other means of education to supplement and even to take the place of formal instruction. The people's debating societies were organized, of which both old and young became members. Henry Clay was active in such a society soon after coming from Virginia. Thomas Ewing and Thomas Corwin, two of Ohio's most gifted statesmen, became members of debating societies, the former at Athens where he was attending college, the latter at Lebanon. These associations allowed the expression of individuality, and developed the ability for independent thought and the power to form correct opinions. Self-control was strengthened as men learned to give due respect to the opinions of others. Leadership was given a chance to prove itself.

Public debates were common on matters of religion and politics. Men acquired the habit of attending these gatherings and thus the platform became a means of popular instruction. Information was disseminated, and practical intelligence was increased, stimulated by social action and reaction. Ideas were interchanged at camp-meetings, celebrations, debates, and court sessions. The courts especially were influential in informing people as to the rights and duties of citizenship. The Ohio Valley naturally became the arena of party politics and the struggle over slavery. Social life and institutions were in a plastic condition in Ohio at this period.

Some centers in the state were far ahead of others in both material and intellectual advancement. None had developed so rapidly as Cincinnati. We have already indicated the extensive commercial and industrial interests of this metropolis of the Ohio Valley. The heterogeneous population from southern, central, and northern states, as well as from

Europe; the various environments from which they came; the ideals and traditions brought along, and the experiences of lives mingled in this center of trade and culture, altogether contributed to make it a most interesting society. Mrs. Harriet Beecher Stowe said of the city in 1834, "With an eclectic society drawn from the finest and best cultivated classes of the older states, there was in the general tone of life a breadth of ideas, a liberality and freedom, which came from the consorting together of persons of different habits of living." [1]

In this city education, politics, religion, and literary activity of all kinds registered their earliest and highest development in the State; here gathered the potent forces of change in the new western society, and here progress was recorded.

Concentration of population and increasing interest in education, caused Cincinnati in 1829 to pass laws giving an independent organization to the city schools and granting power to levy special taxes for the purpose. Ten new buildings were provided for and a board of education was appointed by the city council.

The western teachers in 1831 organized at Cincinnati an association, called the "Western Literary Institute and College of Professional Teachers." The purpose was to promote more efficient private and public education. It was loyally encouraged by pulpit, platform and press. Meetings occurred annually for ten years, with delegates from Pennsylvania, Ohio, Kentucky, Indiana, Illinois, Michigan, Tennessee, Virginia and a half-dozen other southern states. The best scholars of the time addressed these gatherings where talent and zeal came together, and where local prejudices were forgotten in the enthusiasm for a common pur-

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[1] *Cf.* Venable, *Beginnings of Literary Culture*, p. 420.

pose. The association was effective in securing the office of state superintendent of schools in Ohio, and was directly influential in promoting rapid progress in the city schools of Cincinnati.[1]

The first newspaper in the State was published in Cincinnati by William Maxwell in 1793. It was called, "The Centinel of the Northwest Territory." Its motto was, "open to all parties but influenced by none." Other publications followed rapidly both in Cincinnati and in other towns, until Atwater estimated, in 1838, that there were at least 100 weekly papers at that time besides many other periodicals.[2] These papers, for the most part, printed only local and foreign news. Therefore it was long before the newspaper acted as a strong influence to promote unity by informing all parts of the State as to what the other parts were doing and thinking.

From the first there were periodicals devoted to party interests or the propagation of certain beliefs. These publications tended to spread over as wide an area as the interests which they represented. In this field also Cincinnati led the other sections of the State. Among the city's population more interests were represented, more ideas sought expression, and more beliefs required defense. Theological, political and social opinions waxed warm. Faiths were defended by zealous advocates, parties were supported by the press, the status of foreigners was discussed, and the struggle against abolition grew violent.

Judge James Hall, who published the "Western Monthly Magazine" at Cincinnati, stated in 1835 that the articles of the last volume had been written by thirty-seven different persons known to the editor, besides others whose identity

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[1] *Cf.* Atwater, *History of Ohio*, pp. 291 *et seq.*

[2] *History of Ohio*, pp. 320, 321.

was not revealed. Of these thirty-seven persons, nineteen resided outside the State, in West, South, and East. The city had become a center for the expression of the opinions of men.[1]

The "Cincinnati Miscellany" for 1845, (pp. 107-108), recorded twelve daily newspapers, (nine in English and three in German). Of these, four were Democratic and four were Whig. There were also fourteen independent weeklies, besides weekly editions issued by several of the dailies. In addition, thirteen monthlies were devoted to literary, religious, political, educational, and scientific subjects. It is evident that in such a community freedom of expression was the rule and public opinion was being shaped by powerful forces.

Although Ohio was backward during the first half-century in establishing a free school system supported by taxation and administered for the benefit of all, forces were at work to disseminate knowledge and to lay the foundation for a more democratic system. Individuality could not be made to fit a common mould but each locality was developing to the point where it could see that there were a great many interests in which the communities of the State were much alike and upon which, as upon internal improvements, common action would result in greater efficiency and progress.

This freedom, typical of the West, may be strongly contrasted with that of the East by reference to a letter of Dr. William E. Channing, published in the "Messenger" at Cincinnati in 1836. Of Boston he says, "Among all its virtues it does not abound in a tolerant spirit. The yoke of opinion is a heavy one, often crushing individuality of judgment and action . . . Opinion is less individual, or

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[1] *Cf.* Venable, *op. cit.*, pp. 376, 377.

runs more in masses, and often rules with a rod of iron." Channing speaks further in praise of the West, "I desire," he says, "to see a new form of society. I hear of the defects of the West; but I learn that a man there feels himself to be a man and that he has a self-respect, which is not always found in older communities; that he speaks his mind freely . . . ." In reply to an invitation to come to Cincinnati to preach, Dr. Channing says, "I should do it cheerfully if I could . . . . I fear the habits, rules, and criticisms under which I have grown up have not left me the freedom and courage which are needed in the style of address best suited to the western people . . . I have labored to be a free man but, in the state of the ministry and society here, freedom is a hard acquisition."[1]

SUMMARY AND CONCLUSIONS

The details of the first chapter were presented because environment and the material development of a new state shape progress along political, religious, educational, and social lines. This intimate connection has been emphasized throughout the succeeding chapters.

Chapter II.—Not only the environment to which the settlers came, but also the stamp which their previous material and social surroundings had put upon them was of the greatest importance. The sources of Ohio's population were discussed with the object of determining what sort of people came to mingle in the new commonwealth. The back-country regions of the older states had attracted and developed a strong, aggressive, individualistic, and democratic type. Many had come to these regions with a bitter experience of religious and political oppression either in Europe or in the American colonies.

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[1] Venable, *op. cit.*, pp. 75, 76.

Settlers from all the older frontier came to mingle in southern Ohio, when the borders were extended at the beginning of the nineteenth century. Their new environment emphasized the same qualities as the old; the virtues of industry and thrift were intensified; men of action and individual initiative were attracted; great soldiers, statesmen, and captains of industry were developed. Restless nervous energy worked itself out in invention and a masterful grasp of material things. The individual had a chance to prove himself.

Chapter III.—Democracy and the spirit of individual freedom were shown in the opposition to the aristocratic control of the territorial government, and in the demand for statehood. The constitution of the new state incorporated the principles of manhood suffrage and popular control through the legislature, unrestricted by any veto-power. The strong original tendency of the settlers toward local self-government was intensified by the isolation of the communities and the arbitrary conduct of the territorial governor. The first constitution extended the principle of popular election to local officers and made self-government a reality.

Some serious abuses resulted from the grant of unlimited power to the legislature. The efficiency of the courts was impaired, the school funds were wasted, personal legislation was encouraged, and the State finances were misused in public works. The idea of local independence was applied to the whole State in the struggle against the power of the national government in the bank and slavery controversies.

All these democratic tendencies and principles were natural to a people many of whom had been the loyal followers of Jefferson before coming to the State, and most of whom were influenced by the desire for individual opportunity and equality in their efforts to realize their hopes.

Chapter IV.—Different opinions upon the question of slavery were to be expected among a people gathered from New England, the border states, and the South itself. A majority was in favor of excluding slavery from Ohio soil but looked with indifference upon the institution as such. In fact southern Ohio soon became aware that it was a good business proposition to retain slave labor in the South. The coming of free negroes was discouraged by harsh laws, because such immigrants were economically inferior and were held in contempt.

Agitation against slavery through the churches, societies, and the press was begun early in Ohio. It was carried on largely by men who came from the border states or the South itself. This agitation aroused no strong opposition before 1830. After this date the South showed greater intolerance, and agitation threatened the friendly and profitable relations between the two sections. Pressure was at once exerted in southern Ohio to suppress abolition. In spite of mob violence and persecution, the anti-slavery forces increased. The underground system was aiding escaping slaves and the angry slave-holders were insisting on more stringent laws. Ohio responded with a severe fugitive-slave law, and condemned by legislative resolution the conduct of abolitionists.

Increased pressure from the South secured a national fugitive act which made Ohio more than ever a hunting ground for slaves, and, in many cases, invaded the cherished rights of citizens. State clashed with national authority and pride asserted itself. The outside pressure from the South itself unified factions within the State and gathered the forces opposing slavery into the new Republican Party.

Chapters V and VI.—Along with the back-country population from Pennsylvania and the South, the three great frontier religious denominations were introduced into south-

ern Ohio. Their organization and beliefs were adapted to the economic and social conditions of the early settlers. After the Kentucky revival many new sects, organized on more democratic principles, appeared. The parent churches themselves underwent changes. Independence of thought and expression in matters of religion was maintained from the first. Each little town soon came to have several different sects. Men learned at least to tolerate differences of beliefs and to work together for certain common ends.

The conduct of individuals in western society showed the freedom from conventions and restraints of the older states. The initiative, energy and self-reliance were all important qualities on the frontier. It was inevitable that, in some persons, these and other characteristics should develop to a point which endangered the interests of all. Social pressure was therefore exerted in order to promote the peace, order, and prosperity of the whole community.

The evolution of a system of education in the State was slow. The price of learning was persistent individual effort. There was no free public instruction for many years. Private schools and academies were established but he who would enjoy their advantages must be willing to make the struggle. The conditions of the frontier and the traditions of the settlers long rendered public instruction inefficient and inadequate. The early misuse of the public lands, granted for the support of education, showed how little the need of education as a common policy was recognized by the legislators. After 1825, as the State became more of a unit, instruction was gradually organized on a more democratic basis and was more adequately provided for by State and local taxes.

Thus to Ohio came many different elements of population with various customs and beliefs. The isolation of one community from another, for many years made local inter-

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ests dominant. The early separation of one individual from another made possible only a limited coöperation.

But it must be remembered that the people who moved into Ohio had many common ideas and purposes. Democracy and individualism were characteristic of most of the settlers. The environment placed a premium on certain personal qualities. Each settler valued highly the chance to succeed.

Coöperation, which began in the local group, was soon extended over wider areas. The spirit of independence became modified by the needs of larger communities. Ways of communication were developed between local units. The State finally took up the policy of internal improvements because it became clear that all sections would be benefited by a policy which one community could not carry out alone. The State as a whole promoted the organization and maintenance of a common school system when it was recognized that by this means the interests of all the communities would be better served. Industries, developing the natural resources, soon demanded protection by tariff legislation. Ohio's delegation in the House of Representatives was a unit in favor of the bills passed in 1816, 1824 and 1828.

Thus did common interests appear and coöperation spread over wider areas. Decentralization, which was natural for the early settlements, gradually changed into common action for certain ends, made necessary in order to realize the original purposes of the settlers. The extent of the coöperation and the methods of its realization were decided not by an aristocratic governing class but, through the forms of democratic government, by the people themselves.

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CONSANGUINEOUS MARRIAGES IN THE AMERICAN POPULATION

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BY
GEORGE B. LOUIS ARNER

PREFACE

THIS monograph does not claim to treat exhaustively, nor to offer a final solution of all the problems which have been connected with the marriage of kin. The time has not yet come for a final work on the subject, for the systematic collection of the necessary statistics, which can only be done by governmental authority, has never been attempted. The statistics which have been gathered, and which are presented in the following pages, are fragmentary, and usually bear upon single phases of the subject, but taken together they enable us better to understand many points which have long been in dispute.

The need for statistics of the frequency of occurrence of consanguineous marriages has been strongly felt by many far-sighted men. G. H. Darwin and A. H. Huth have tried unsuccessfully to have the subject investigated by the British Census, and Dr. A. G. Bell has recently urged that the United States Census make such an investigation.[1] Another motive for undertaking this present work, aside from the desire to study the problems already referred to, has been to test the widely prevalent theory that consanguinity is a factor in the determination of sex, the sole basis of which seems to be the Prussian birth statistics of Düsing, which are open to other interpretations.

The stock illustrations from isolated communities have been omitted as too difficult to verify, and little space has

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[1] *Cf.* Bell, "A Few Thoughts Concerning Eugenics." In *National Geographic Magazine*, March, 1908.

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been given to the results of the inbreeding of domestic animals, for although such results are of great value to Biology, they are not necessarily applicable to the human race.

The writer regrets that it is impossible here to acknowledge all his obligations to those who have assisted him in the preparation of this work. Such acknowledgement is due to the many genealogists and other friends who have kindly furnished detailed cases of consanguineous marriage. For more general data the writer is especially indebted to Dr. Alexander Graham Bell, to Dr. Martin W. Barr, to Professor William H. Brewer of Yale University, and to Dr. Lee W. Dean of the University of Iowa. In the preparation of the manuscript the suggestions and criticisms of Professors Franklin H. Giddings and Henry L. Moore have been invaluable.

G. B. L. A.

March, 1908.

CONTENTS

PAGE

CHAPTER I

INTRODUCTION

Problems to be Treated—Degrees of Consanguinity—Literature of the Subject—Noah Webster—Bemiss—Dally—G. H. Darwin—Huth—Bell—Legal Status in the United States—Methods of Investigation—Genealogical—Personal—Isolated Communities . . 9

CHAPTER II

RATIO OF THE CONSANGUINEOUS TO ALL MARRIAGES

Previous Estimates—Mayo-Smith—Mulhall—Darwin—Application of Darwin's Method to American Data—Direct Method—Consanguineal Attraction—Same-name and Different-name Cousin Marriages—Summary 18

CHAPTER III

MASCULINITY

Constancy of the Sex-ratio—Consanguinity and Masculinity—Theory of Westermarck and Thomas—Duesing—Gache—Negroes in the United States—Genealogical Material—Other Compilations—Summary 30

CHAPTER IV

CONSANGUINITY AND REPRODUCTION

Theories of the Effect of Consanguinity upon Offspring—Comparative Fertility—Statistics from Darwin and Bemiss—Genealogical Statistics—Youthful Death-rate—Degeneracy—Fallacies in the Work of Bemiss—Isolated Communities—*The Jukes*—Other Degenerate Families—Scrofula 38

CHAPTER V

CONSANGUINITY AND MENTAL DEFECT

Idiocy and Insanity—Inheritability of Mental Defect—Intensified Heredity—Barr's Investigations—Other American and English Data—Mayet's Prussian Statistics—Genealogical Data 51

PAGE

CHAPTER VI

CONSANGUINITY AND THE SPECIAL SENSES

United States Census Data—The Blind—Consanguinity of Parents—Blind Relatives—Degree of Blindness—Causes of Blindness—Retinitis Pigmentosa—European Data—Probability of Blind Offspring of Consanguineous Marriages—The Deaf—Irish Census—Scotland and Norway—United States Census—Consanguinity of Parents—Deaf Relatives—Causes of Deafness—Degree of Deafness—Direct Inheritance of Deafness—Intensification through Consanguinity—Dr. Fay's Statistics—Personal Data—Probability of Deaf Offspring from Consanguineous Marriages—Opinion of Dr. Bell 59

CHAPTER VII

SUMMARY AND CONCLUSION

Summary of Results—Inbreeding and Evolution—Effects of Close Inbreeding—Crossing and Variation—"Difference of Potential"—Resemblance and Intensification—Coefficient of Correlation between Husband and Wife—Between Cousins—Between Brothers and Sisters—Consanguinity and Eugenics—Consanguinity and Social Evolution—Conclusion 86

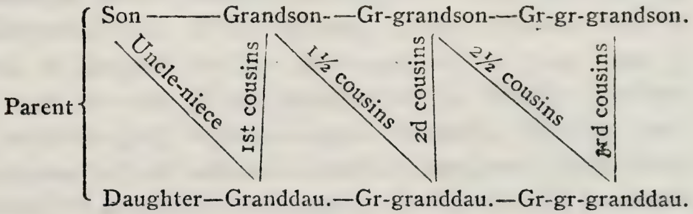
CHAPTER I

INTRODUCTION

THE purpose of this essay is to present in a concise form and without bias or prejudice, the most important facts in regard to consanguineous marriages, their effects upon society, and more particularly their bearing upon American social evolution. The problems to be considered are not only those which relate primarily to the individual and secondarily to the race, such as the supposed effect of blood relationship in the parents upon the health and condition of the offspring; but also the effect, if any, which such marriages have upon the birth-rate, upon the proportion of the sexes at birth, and the most fundamental problem of all, the relative frequency with which consanguineous marriages take place in a given community.

No thorough and systematic study of the subject has ever been made, and could not be made except through the agency of the census. The statistical material here brought together is fragmentary and not entirely satisfactory, but it is sufficient upon which to base some generalizations of scientific value. The sources of these data are largely American. Little attempt is made to study European material, or to discuss phases of the problem which are only of local concern. Some topics, therefore, which have frequently been treated in connection with the general subject of consanguineous marriages are here ignored as having no scientific interest, as for instance that of the so-called "marriages of affinity," which has been so warmly debated for the past fifty years in the British Parliament.

For obvious reasons it will often be impossible to distinguish between the different degrees of consanguinity, but wherever possible the degree will be specified. It is probable that where a number of marriages are vaguely given as consanguineous, few are more distant than second cousins, for in the United States especially, distant relationships are rarely traced except by genealogists. In designating degrees of relationship the common terminology will be used, as in the following table, expressing, however, the rather clumsy expression, "first cousin once removed" by the simpler form "1½ cousin."


Son——Grandson——Gr-grandson——Gr-gr-grandson.
Parent
Uncle-niece
1st cousins
1½ cousins
2d cousins
2½ cousins
3rd cousins
Daughter—Granddau.—Gr-granddau.—Gr-gr-granddau.

By far the greater part of the literature of consanguineous marriage is of a controversial rather than of a scientific nature, and a search for statistical evidence for either side of the discussion reveals surprisingly little that is worthy of the name. Yet men of high scientific standing have repeatedly made most dogmatic assertions in regard to the results of such unions, and have apparently assumed that no proof was necessary. For example, Sir Henry Sumner Maine "cannot see why the men who discovered the use of fire, and selected the wild forms of certain animals for domestication and of vegetables for cultivation, should not find out that children of unsound constitution were born of nearly related parents."[1]

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[1] Maine, *Early Law and Custom*, p. 228.

Much space is given to the alleged "innate horror of incest," and frequent appeals are made to Scripture, wrongly assuming that the marriage of cousins is prohibited in the Mosaic Law.

The origin of "prohibited degrees" is only conjectural. The Christian Church apparently borrowed its prohibitory canons from the Roman Law,[1] and a dispensation is still necessary before a Catholic can marry his first cousin. However, such dispensations have always been easy to obtain, especially by royal families, and even the marriage of uncle and niece sometimes occurs, as among the Spanish Habsburgs, and as recently as 1889 in the House of Savoy.

The prohibition of the marriage of first cousins was removed in England by the Marriage Act of 1540,[2] but by this time the idea of the harmfulness of kinship marriage was so thoroughly impressed upon the people that they were very prone to look askance at such unions, and if they were followed by any defective progeny, the fact would be noted, and looked upon as a chastisement visited upon the parents for their sin. Naturally the idea became proverbial, and in some places it has influenced the civil law.

Perhaps the first printed discussion of the subject in America is from the pen of Noah Webster, in an essay which should be as interesting to the spelling reformer as to the sociologist.[3] He writes: "It iz no crime for brothers and sisters to intermarry, except the fatal consequences to society; for were it generally practised, men would become a race of pigmies. It iz no crime for brothers' and sisters'

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[1] Luckock, *History of Marriage*, p. 282.

[2] Child, "On Marriages of Consanguinity," in *Medico-Chirurgical Review*, April, 1862, p. 469.

[3] Webster, *Collection of Essays and Fugitiv Writings on Moral, Historical, Political and Religious Subjects*, 1790, p. 322.

children to intermarry, and this iz often practised; but such near blood connections often produce imperfect children. The common peeple hav hence drawn an argument to proov such connections criminal; considering weakness, sickness and deformity in the offspring az judgements upon the parents. Superstition iz often awake when reezon iz asleep."

From about 1855 to 1880 much was written about the effect of consanguineal interbreeding. One of the first contributions came from America. In 1858 Dr. S. M. Bemiss, of Louisville, Kentucky, reported to the American Medical Association the results of his investigation of 833 cases of consanguineous marriage.[1] His compilation remains to this day the largest single piece of direct statistical work on the subject. Unfortunately, however, his statistics have a strong, if unintentional, bias which seriously affects their value. In France one of the earliest discussions was by M. Boudin,[2] who evidently obtained the Bemiss report (attributing it to Dr. O. W. Morris, who had quoted freely from Bemiss),[3] and enlarged greatly upon its fallacies. He also collected statistics of the deaf-mutes in Paris, and, by an amazing manipulation of figures, "demonstrated" that consanguinity of the parents was the cause of nearly one-third of the cases of congenital deafness. The savants of the Société d'Anthropologie took sides and the debate became very entertaining. Finally M. Dally came to the rescue, and published some very sane and logical articles which avoided both extremes, and first advanced

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[1] See *Transactions of the American Medical Association*, 1858, pp. 321-425.

[2] "Du Croisement des familles," *Mem. de la Société d'Anthropologie*. vol. i, 1860-63, pp. 505-557.

[3] See Morris: "On Marriages of Consanguinity," in *Amer. Med. Times*, Mar. 23, 1861.

the theory that any ill effects of consanguineous marriage should be attributed to the intensification of inherited characteristics.[1]

In England similar discussions took place during the same period, complicated, however, by the presence of the patient and long-suffering "deceased wife's sister." The best of the English work has been the statistical study by George H. Darwin,[2] and the classic "Marriage of Near Kin" by Alfred H. Huth, a book of 475 pages, including a very complete bibliography to the date of the second edition, 1885. Although Mr. Huth's book is not free from error, and is encumbered with a large amount of worthless material, it is now after thirty-three years, by far the best treatment of the subject.

In Italy Dr. Montegazza,[3] in Spain Señor Pastor[4] and others, have made useful contributions. German writers have usually preferred more general subjects, but many of them have given much space to consanguineous marriage in sociological and biological works.

Since the appearance of the Bemiss report little has been published in this country which bears directly upon our subject. The most important American contribution, however, is to be found in the Special Report on the Blind and the Deaf, in the Twelfth Census of the United States, prepared by Dr. Alexander Graham Bell. Although American writers have had little part in the theoretical discussions, our

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[1] See *Bulletins de la Société d'Anthropologie*, 1863, pp. 515-575; 1877, pp. 203-213.

[2] "Marriages of First Cousins in England and their Effects," *Journal Statistical Society*, 1875, pp. 153-184.

[3] *Studj Sui Matrimonj Consanguinei.* Quoted by Darwin, *op. cit.*, p. 178.

[4] "De los Matrimonios entre Parientes," *Memorias de la Real Academia de Ciencias Morales y Politicas*, vol. ii, pp. 369-400.

legislators have been active, so that the statutes of every state specify degrees of kinship within which marriage is prohibited. In at least sixteen states the prohibition is extended to include first cousins. In New Hampshire such marriages are void and the children are illegitimate. Other states in which first-cousin marriage is forbidden are Pennsylvania, Ohio, Indiana, Illinois, Michigan, Kansas, North Dakota, South Dakota, Wyoming, Nevada, Washington, Oregon, Missouri, Arkansas, and Louisiana. Since both Oklahoma and Indian Territory had similar laws, the present State of Oklahoma should probably be added to this list. In all of these states marriages within the prohibited degrees are incestuous or void or both, except in Ohio, where no express declaration is made in the statute. In Ohio, Indiana, Nevada and Washington the law is made to read: "and not nearer of kin than *second cousins*," therefore including "1½ cousins" within the prohibited degrees. In many states the marriage of step relatives is forbidden, as also marriage with a mother-in-law or father-in-law. Of the territories, Arizona, Alaska, and Porto Rico forbid the marriage of first cousins, but in Porto Rico the court may waive the impediment.

These laws probably have some effect in reducing the number of consanguineous marriages in these states, but the sentiment back of the law is more responsible for the decrease in the number of such unions than the law itself. For in the nature of things enforcement would be very difficult, and apparently little real effort is made in that direction. In Ohio, and probably elsewhere, the question as to consanguinity is not directly put to the applicants for a marriage license. The applicants are required to answer the

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[1] Howard, *History of Matrimonial Institutions*, vol. ii, pp. 397, 433, 473.

usual questions in regard to age, parentage, residence, etc., and are then required to swear that their previous statements have been correct and that neither of them is "epileptic, imbecile or insane," that they are "not nearer of kin than second cousins, and not at the time under the influence of any intoxicating liquor or narcotic drug." Undoubtedly violations of the consanguinity clause are very frequent, and it is likewise easily evaded by going to another state where the laws are more liberal. One effect of the law is to provide a painless method of severing the marriage bond. A correspondent, who is a District Court Judge in Kansas, in reporting a case of first cousin marriage, adds that he "divorced them on the ground of consanguinity."

In the absence of direct investigation by the Census Bureau, or other public records of consanguineous marriages, perhaps the most promising field for research is in the genealogical records of American families. Several thousand volumes of such material have been published within the last half-century, and a large number of these are very carefully and scientifically prepared. The material gathered from such sources is very accurate in regard to the number of births, youthful deathrate etc., but mental or physical defects are rarely mentioned. The greatest objection to the utilization of this material, however, is the amount of labor necessary in order to glean the desired facts from the mass of irrelevant data. For example, in order to find one case of first cousin marriage it is necessary on an average, to examine the records of nearly two hundred other marriages.

The collection of data from personal sources is likewise open to grave objections. Not only is the informant likely to be biassed, but the cases which he will remember will be those in which something unusual has occurred. Herein lay the fallacy in the conclusions of Dr. Bemiss. I have

endeavored to overcome this bias by restricting my requests for information to genealogists and others who would more naturally appeal to records, but my efforts have been only partially successful.

The number of cases of consanguineous marriage, embracing all degrees of consanguinity, which I have collected from these two sources, genealogies and correspondence, is 723, a number too small in itself to establish any definite conclusions; but by using this material in connection with other related data, I trust I may be able to add something to the comparatively small amount of real knowledge which the world already possesses in regard to the marriage of kin.

In the course of my investigations I visited Smith's Island, in the Chesapeake Bay, about twelve miles across Tangier Sound, from Crisfield, Maryland, and nearly opposite the mouth of the Potomac. Here is a community of about seven hundred people, who are principally engaged in the sea-food industry. Their ancestors have lived on the island for many generations and there have been comparatively few accessions to the population from the mainland. As a natural consequence the population is largely a genetic aggregation. Consanguineous marriages have been very frequent, until now nearly all are more or less interrelated. Out of a hundred or more families of which I obtained some record, at least five marriages were between first cousins. All of these were fertile, and all the children were living and apparently healthy. Since over thirty per cent of the inhabitants bear one surname (Evans), and those bearing the first four surnames in point of frequency (Evans, Bradshaw, Marsh, and Tyler) comprise about fifty-nine per cent of the population, it will readily be seen that comparatively few absolutely non-related marriages take place. Yet in this community from September, 1904, to October, 1907, or during the residence there of the present physician, Dr.

P. H. Tawes, there have been 87 births and but 30 deaths, the latter from the usual causes. During this period there has not been a single case of idiocy, insanity, epilepsy, deaf-mutism or even of typhoid fever on the island.

The evidence gathered from various other isolated communities is very conflicting. Huth describes a great many of them which have existed for many generations without crosses without ill results. Other writers quote instances where whole communities have become degenerate. Until the antecedents of a community are known it is of course impossible to estimate the effect of consanguinity. The exceptionally high percentage of deaf-mutism on Martha's Vineyard may to some extent be due to a high percentage of consanguineous marriage, but that inbreeding is not the primary cause is revealed by the records showing that among the first settlers were two deaf-mutes, whose defect has been inherited from generation to generation for two hundred and fifty years.[1]

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[1] See article in Cincinnati *Gazette*, Jan. 22, 1895.

CHAPTER II

RATIO OF THE CONSANGUINEOUS TO ALL MARRIAGES

TOWARDS determining the average frequency of occurrence of consanguineous marriages, or the proportion which such marriages bear to the whole number of marriages, little has as yet been done in this country. Professor Richmond Mayo-Smith estimated that marriages between near kin constituted less than one per cent of the total,[1] and Dr. Lee W. Dean estimates that in Iowa they comprise only about one half of one per cent.[2] But these estimates are little more than guesses, without any statistical basis.

In several European countries such marriages have been registered, though somewhat spasmodically and inaccurately. According to Mulhall [3] the ratio of the consanguineous among 10,000 marriages in the various countries is as follows:

TABLE I.

Country.	*Ratio.*	*Country.*	*Ratio.*
Prussia	67	Alsace	107
Italy	69	France	126
England	75	Jews	230

According to Uchermann the ratio is 690 or 6.9 per cent, including marriages between second cousins and nearer.[4] Dr. Feer says that 4 per cent of the marriages in Saxony

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[1] *Statistics and Sociology*, p. 112.

[2] *Effect of Consanguinity upon the Organs of Special Sense*, p. 4.

[3] *Dictionary of Statistics*, p. 383.

[4] *Les Sourds-muets en Norvège.* Quoted by Feer, p. 9.

are consanguineous.[1] The ratio seems to be increasing in France but diminishing in Alsace and Italy, as indicated in Table II.[2]

TABLE II.

Country.	*Date.*	*Ratio.**	*Country.*	*Date.*	*Ratio.**
France	1853–60	97	France	1861–71	126
Alsace	1858–65	143	Alsace	1872–75	107
Italy	1868–71	84	Italy	1872–75	69

* Per 10,000.

In Italy the ratio varies greatly in different parts of the country. Mulhall gives the following figures for the years 1872-75:

TABLE III.

Province.	*Ratio.**	*Province.*	*Ratio.**
Venice	24	Sicily	117
Naples	30	Piedmont	131
Lombardy	100	Liguria	183

* Per 10,000.

It will be noted that the lowest ratios are in provinces where the urban population is comparatively large. Wherever statistics have been gathered it is the rule that the percentage of consanguineous marriage is greater in rural than in urban districts. Table IV, also from Mulhall, illustrates this point.

TABLE IV.

	Ratio per 10,000 Marriages.		
Country.	*Rural.*	*Urban.*	*General.*
England	79	71	75
France	130	115	126
Alsace	121	41	107
Norway* (Uchermann)	810	260	690

* Includes second cousins.

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[1] *Der Einfluss der Blutsverwandschaft der Eltern auf die Kinder*, p. 9.

[2] Mulhall, *Dictionary of Statistics*, p. 383.

In regard to the degree of consanguinity, it seems very probable that in the French, German, Italian, and English statistics and estimates few if any marriages beyond the degree of first cousins are returned as consanguineous, so in order to compare the Norwegian figures with the others they should probably be reduced by one half. Out of 1549 consanguineous marriages contracted in Prussia in 1889, 1422 were between "cousins" (probably first), 110 between uncles and nieces, and 16 between nephews and aunts.[1] The ratio of such marriages to 10,000 in France during the fifteen years ending in 1875 was:[2]

TABLE V.

Degree.	*Urban.*	*Rural.*	*All France.*
Nephew and aunt	1.6	2.4	2.1
Uncle and niece	6.0	5.6	5.8
"Cousins"	96.0	119.0	113.1
Total	103.6	127.0	121.2

In Italy during seven years ending in 1874, of all consanguineous marriages 92 per cent were of cousins and 8 per cent were of uncle and niece or aunt and nephew.[3]

Dally [4] is very skeptical about the accuracy of the French figures, but says that in Paris the records are well kept. He found that in the years 1853-62 there were 10,765 marriages in the *8me arrondissement* of Paris, and of these he finds:

Marriages between cousins-german	141
Marriages between uncle and niece	8
Marriages between aunt and nephew	1
Total consanguineous	150

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[1] Mulhall, *op. cit.*, p. 383.

[2] *Ibid.*, p. 384.

[3] *Ibid.*, p. 384.

[4] "Recherches sur les Mariages Consanguins et sur les Races Pures," in *Bulletins de la Société d'Anthropologie*, 1863, p. 527.

This is rather higher than the average for urban districts, according to official figures, but Dally seems to consider it as typical. He gives examples of the carelessness and incompetency of the rural record keepers, and insists that the percentage is really much higher than the official figures would indicate. He estimates the consanguineous marriages in France not including second cousins, at from four to five per cent.

A very ingenious method of determining the approximate number of first-cousin marriages was devised by Mr. George H. Darwin.[1] Noticing that in marriage announcements, some were between persons of the same surname, it occurred to him that there might be a constant ratio between same-name marriages and first cousin marriages. Some same-name marriages would of course be purely adventitious; so, to eliminate this element of chance, he obtained from the Registrar General's Report the frequency of occurrence of the various surnames in England. The fifty commonest names embraced 18 per cent of the population. One person in every 73 was a Smith, one in every 76 a Jones and so on. Then the probability of a Smith-Smith marriage due to mere chance would be $1/73^2$ and of a Jones-Jones morriage $1/76^2$. The sum of fifty such fractions he found to be .0009207 or .9207 per thousand. After the fiftieth name the fractions were so small as to have comparatively little effect upon the total. He therefore concluded that about one marriage in a thousand takes place, in which the parties have the same surname and have been uninfluenced by any relationship between them bringing them together.

The next step was to count the marriages announced in the "*Pall Mall Gazette*" for the years 1869-72 and a part

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[1] "Marriages between First Cousins in England and their Effects," in *Journal of the Statistical Society*, June, 1875, pp. 154 *et seq.*

of 1873. Of the 18,528 marriages there found, 232 or 1.25 per cent were between persons of the same surname. Deducting the percentage of chance marriages at least 1.15 per cent were probably influenced directly or indirectly by consanguinity.

Mr. Darwin then proceeded by a purely genealogical method. He found that out of 9,549 marriages recorded in "Burke's *Landed Gentry*," 144 or 1.5 per cent were between persons of the same surname, and exactly half of these were first cousins. In the "*English and Irish Peerage*" out of 1,989 marriages, 18 or .91 per cent were same-name first cousin marriages. He then sent out about 800 circulars to members of the upper middle class, asking for records of first cousin marriage among the near relatives of the person addressed, and obtained the following result:

Same-name first cousin marriages	66
Different-name first cousin marriages	182
Same-name not first cousin marriages	29

These cases furnished by correspondents he calculated to be 3.41 per cent of all marriages in the families to which circulars were sent.

From the data collected from all these sources Mr. Darwin obtains the following proportion:

$$\frac{\text{Same-name first cousin marriages}}{\text{All same-name marriages}} = \frac{142}{249} = .57$$

He is inclined to think that the ratio should be lower and perhaps .50 instead of .57. By a similar line of reasoning he obtains this proportion:

$$\frac{\text{Same-name first cousin marriages}}{\text{Different-name first cousin marriages}} = \frac{1}{3}$$

Here too, he fears that the denominator is too small, for by theoretical calculation he obtains by one method the ratio

2/7, and by another $\frac{1}{1}$. He finally takes ¼ for this factor. To express the proportion in another form:

$$\frac{\text{Same-name first cousin marriages}}{\text{All first cousin marriages}} = \frac{1}{5}$$

The completed formula then becomes:

$$\frac{\text{All same-name marriages}}{\text{All first cousin marriages}} = \frac{100}{57} \times \frac{1}{5} = .35 \text{ (nearly)}.$$

Applying this formula to the English statistics, Mr. Darwin computes the percentages of first cousin marriages in England with the following results:

London	1.5
Other urban districts	2.
Rural districts	2.25
Middle class and Landed Gentry	3.5
Aristocracy	4.5

In order to apply this formula to the American population I counted the names in the New York Marriage License Record previous to 1784,[1] and found the number to be 20,396, representing 10,198 marriages. The fifty commonest names embraced nearly 15 per cent of the whole (1526), or three per cent less than the number found by Darwin.[2] Of these, one in every 53 was a Smith, one in 192 a Lawrence, and so on. The sum of the fraction $1/53^2$, $1/192,^2$ etc., I found to be .000757 or .757 per thousand, showing that the probability of a chance marriage between persons of the same name was even less than in England, where Mr. Darwin considered it almost a negligible quantity.

Of these 10,198 marriages, 211, or 2.07 per cent were between persons bearing the same surname. Applying Darwin's formula we would have 5.9 as the percentage of first

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[1] *Names of Persons for whom Marriage Licenses were issued by the Secretary of the Province of New York.*

[2] *Cf. supra*, p. 21.

cousin marriages in colonial New York. This figure is evidently much too high, so in the hope of finding the fallacy, I worked out the formula entirely from American data. To avoid the personal equation which would tend to increase the number of same-name first cousin marriages at the expense of the same-name not first cousin marriages, I took only those marriages obtained from genealogies, which would be absolutely unbiassed in this respect. Out of 242 marriages between persons of the same name, 70 were between first cousins, giving the proportion:

$$\frac{\text{Same-name first cousin marriages}}{\text{All same-name marriages}} = \frac{70}{242} = .285$$

as compared with Darwin's .57. So that we may be fairly safe in assuming that not more than ⅓ of all same-name marriages are first cousin marriages. Taking data from the same sources and eliminating as far as possible those genealogies in which only the male line is traced, we have it:

$$\frac{\text{Same-name first cousin marriages}}{\text{Different-name first cousin marriages}} = \frac{24}{62} = \frac{1}{2\frac{7}{12}}$$

This is near the ratio which Darwin obtained from his data, and which he finally changed to ¼. I am inclined to think that his first ratio was nearer the truth, for since we have found that the coefficient of attraction between cousins would be so much greater than between non-relatives, why should we not assume that the attraction between cousins of the same surname should exceed that between cousins of different surnames? For among a large number of cousins a person is likely to be thrown into closer contact, and to feel better acquainted with those who bear the same surname with himself. But since the theoretical ratio would be about ¼ it would hardly be safe to put the probable ratio higher than ⅓, or in other words four first cousin mar-

riages to every same-name first cousin marriage. Our revised formula then is:

$$\frac{\text{All same-name marriages}}{\text{All first cousin marriages}} = \frac{3}{1} \times \frac{1}{4} = .75$$

Instead of Mr. Darwin's .35.

Taking then the 10,198 marriages, with their 2.07 per cent of same-name marriages, and dividing by .75 we have 2.76 per cent, or 281 first cousin marriages.

In order to arrive at approximately the percentage of first cousin marriages in a nineteenth-century American community I counted the marriage licenses in Ashtabula County, Ohio, for seventy-five years, (1811-1886). Out of 13,309 marriages, 112 or .84 per cent were between persons of the same surname. Applying the same formula as before, we find 1.12 per cent of first cousin marriages, or less than half the percentage found in eighteenth-century New York. This difference may easily be accounted for by the comparative newness of the Ohio community, in which few families would be interrelated, and also to that increasing ease of communication which enables the individual to have a wider circle of acquaintance from which to choose a spouse.

Adopting a more direct method of determining the frequency of cousin marriage, I estimated in each of sixteen genealogical works, the number of marriages recorded, and found the total to be 25,200. From these sixteen families I obtained 153 cases of first cousin marriage, or .6 per cent. Allowing for the possible cases of cousin marriage in which the relationship was not given, or which I may have overlooked, the true percentage is probably not far below the 1.12 per cent obtained by the other method.

The compiler of the, as yet, unpublished Loomis genealogy writes me that he has the records of 7500 marriages in that family, of which 57 or .8 per cent are same-name mar-

riages. This would indicate that 1.07 per cent were between first cousins.

In isolated communities, on islands, among the mountains, families still remain in the same locality for generations, and people are born, marry and die with the same environment. Their circle of acquaintance is very limited, and cousin marriage is therefore more frequent. If we exclude such places, and consider only the more progressive American communities, it is entirely possible that the proportion of first cousin marriages would fall almost if not quite to .5 per cent. So that the estimate of Dr. Dean for Iowa may not be far out of the way.

Even for England Mr. Darwin's figures are probably much too large. Applying the corrected formula his table becomes:

TABLE VI.

1872.	*Number marriages registered.*	*Per cent of same-name marriages.*	*Per cent of first cousin marriages.*
London, Metropolitan Districts	33,155	.55	.73
Urban Districts	22,346	.71	.95
Rural Districts	13,391	.79	1.05
Total	68,892	.64	.85*

* *Cf.* Mulhall, .75 per cent, *supra*, p. 18.

In regard to the frequency of marriage between kin more distant than first cousins figures are still more difficult to obtain. The distribution of 514 cases of consanguineous marriage from genealogies was as follows:

TABLE VII.

	First cousins.	1½ cousins.	Second cousins.	2½ cousins.	Third cousins.	Distant cousins.	Total.
Same-name	70	24	49	19	20	26	208
Different-name	96	30	58	22	37	62	305
Total	166	54	107	41	57	88	513

Obviously this cannot be taken as typical of the actual distribution of consanguineous marriages, since the more distant the degree, the more difficult it is to determine the relationship. However it is very evident that the coefficient of attraction is at its maximum between first cousins, and probably there are actually more marriages between first cousins than between those of any other recognized degree of consanguinity. But the two degrees of 1½ cousins and second cousins taken together probably number more intermarriages than first cousins alone. Allowing four children to a family, three of whom marry and have families, the actual number of cousins a person would have on each degree would be: First, 16; 1½, 80; Second, 96; 2½, 480; Third, 576; Fourth, 3,456. The matter is usually complicated by double relationships, but it will readily be seen that the consanguineal attraction would hardly be perceptible beyond the degree of third cousins.[1]

Omitting, as in the discussion on page 24, those genealogies in which only the male line is given we have the following table:

TABLE VIII.

	First cousins.	1½ cousins.	Second cousins.	2½ cousins.	Third cousins.	Distant cousins.	Total
Same-name	24	5	10	4	2	5	50
Different-name	62	15	33	12	23	26	171
Total	86	20	43	16	25	31	221

It would naturally be supposed that with each succeeding degree of relationship the ratio of same-name to different-name cousin marriages would increase in geometrical proportion, viz. first cousins, 1 : 3; second cousins, 1 : 9; third cousins, 1 : 27, etc., but on the other hand there is the tendency for families of the same name to hold together even

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[1] See note, *infra*, p. 29.

in migration as may be proved by the strong predominance of certain surnames in nearly every community. So that the ratio or same-name to different-name second cousin marriages may not greatly exceed 1 : 4. Beyond this degree any estimate would be pure guesswork. However the coefficient of attraction between persons of the same surname would undoubtedly be well marked in every degree of kinship, and conversely there are few same-name marriages in which some kinship, however remote, does not exist.

The proportion of mixed generation cousin marriages (1½ cousins, 2½ cousins, etc.) is always smaller than the even generation marriages of either the next nearer or more remote degrees. For example, a man is more likely to marry his first or his second cousin than either the daughter of his first cousin, or the first cousin of one of his parents, although such mixed generation marriages often take place.

The conclusions, then, in regard to the frequency of consanguineous marriage in the United States may be summarized as follows:

1. The frequency varies greatly in different communities, from perhaps .5 per cent of first cousin marriages in the northern and western states to 5. per cent, and probably higher, in isolated mountain or island communities. The average of first cousin marriage in the United States is probably not greater than one per cent.

2. The percentage of consanguineous marriages is decreasing with the increasing ease of communication and is probably less than half as great now as in the days of the stage coach.

3. Although the number of marriageable second cousins is usually several times as great as that of first cousins, the number of marriages between second cousins is probably somewhat less than the number of marriages between first cousins, but the number of second cousin marriages com-

bined with the number of 1½ cousin marriages probably exceeds the number of first cousin marriages alone. So that the percentage of marriages ordinarily considered consanguineous is probably between two, and two and a half.

Note.—In an article entitled "Sur le nombre des consanguins dans un groupe de population," in *Archives italiennes de biologie* (vol. xxxiii, 1900, pp. 230-241), Dr. E. Raseri shows that from one point of view the actual number of consanguineous marriages is little, if any, greater than the probable number. The average number of children to a marriage he finds to be 5, the average age of the parents 33 and the average age at marriage 25. The Italian mortality statistics show that 54 per cent of the population lives to the age of 25, of which 15 per cent does not marry, leaving an average of 2.3 children in every family who marry. On this basis a person would have at birth 4,357 relatives within the degree of fourth cousins; at the age of 33 he would have 4,547; and at 66, 5,002. In 1897 out of 229,041 marriages in Italy, 1,046 were between first cousins, giving an average of one in 219. In 1881 the number of men between 18 and 50 and of women between 15 and 45 was 5,941, 495 in 8,259 communes with an average population of 3,500. In each commune there must be 360 marriageable persons of each sex, but to marry within his class a man would only have the choice of 180 women and *vice versa*. Adding the probable number who would marry outside the commune, the choice lies within 216 of the opposite sex. Of these 25 would be cousins within the tenth degree (fourth cousins) making the probability of a consanguineous marriage .11, reduced by a probable error in excess to .10. The probability of a first cousin marriage would be $\frac{.82}{216}$ or .0038, whereas the actual ratio is $\frac{1}{219}$ or .0045.

CHAPTER III

MASCULINITY

THE predominance of male over female births is almost universal, although varying greatly in different countries and under different conditions. This fact has given rise to the term Masculinity, which conveniently expresses the proportion of the sexes at birth. The degree of masculinity is usually indicated by the average number of male births to every 100 female births. The cause of this preponderance of males is still a mystery, and will definitely be known only when the causes of the determination of sex are known. Since, however, it is well known that infant mortality is greater among males than among females, positive masculinity is necessary to keep up the balance of the sexes, and therefore seems to be an essential characteristic of a vigorous and progressive race.

Within recent years the theory has prevailed among certain sociologists that positive masculinity is stronger in the offspring of consanguineous marriages than in the offspring of unrelated parents. Professor William I. Thomas in his writings and lectures asserts this as highly probable.[1] Westermarck,[2] to whom Professor Thomas refers, quotes authorities to show that certain self-fertilized plants tend to produce male flowers, and that the mating of horses of the same coat color tends to produce an excess of males.[3]

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[1] *Sex and Society*, p. 12.

[2] *History of Human Marriage*, p. 476.

[3] *Goehlert, Ueber die Vererbung der Haarfarben bei den Pferden.* Quoted by Westermarck, p. 476.

Westermarck continues, quoting from Düsing:[1] "Among the Jews, many of whom marry cousins, there is a remarkable excess of male births. In country districts, where, as we have seen, comparatively more boys are born than in towns, marriage more frequently takes place between kinsfolk. It is for a similar reason that illegitimate unions show a tendency to produce female births."

Westermarck comments: "The evidence for the correctness of his deduction is, then, exceedingly scanty—if, indeed it can be called evidence. Nevertheless, I think his main conclusion holds good. Independently of his reasoning I had come to exactly the same result in a purely inductive way." He then quotes a number of travelers to the effect that marriage between members of different races produce a phenomenal excess of female births. When we consider the extraordinary proficiency in fiction attained by many travelers in strange lands, we are forced to the belief that Westermarck based his own conclusion on still more scanty evidence.

The statistics given by Dr. Düsing for Prussia[2] are as follows:

TABLE IX.

	Evangelical.	*Catholic.*	*Other Christians.*	*Jews.*
Male births....	4,015,634	2,273,708	12,283	69,901
Female births..	3,775,010	2,136,295	11,548	64,939
Masculinity....	106.374	106.435	106.36	107.64

and for mixed marriages:

TABLE X.

	Evangelical and Catholic.	*Catholic and Evangelical.*	*Other mixed.*	*Jews and Christians.*
Male births....	157,755	189,733	4,464	2,958
Female births..	149,205	179,505	4,254	2,850
Masculinity....	105.73	105.70	104.9	103.8

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[1] *Die Regulierung des Geschlechtsverhaeltnisses*, pp. 243-244.

[2] *Das Geschlechtsverhaeltnis der Geburten in Preussen*, pp. 24-25; in *Staatswissenschaftliche Studien*, vol. iii.

In the face of these statistics it is impossible to deny that endogamy within a great social class or an ethnic race may have some tendency to produce an excess of male births, while exogamy in this broad sense may diminish the masculinity. But the perpetuation of a comparatively pure race by marriage within that race, and consanguineous marriage in the narrower sense are different propositions. It may easily be that the marriage of individuals of a similar type regardless of consanguinity produces a greater excess of male offspring. According to the percentage of first cousin marriages among the Jews as given by Mulhall,[1] and allowing the average number of children to a marriage, there would be only 3100 children of such marriages among the Jewish births in Prussia, and in order that these might raise the masculinity of Jewish births even from 106 to 107 the 3100 births would have to have a masculinity of 200. Among Protestants, or especially among Catholics where the percentage of cousin marriage is much smaller, it seems hardly reasonable that the general masculinity would be appreciably affected. A much better case can be made for similarity or difference of race as the cause of the variation. The difference between Catholic and Protestant is, roughly speaking, the difference between the brachycephalic brunette Alpine race and the dolichocephalic blonde Baltic race. So that a mixed marriage in Germany would almost always mean the crossing of two distinct types.

The investigations of M. Gache in Buenos Ayres covering the period from 1884 to 1894 inclusive, show that cross breeding has had the effect of *raising* the masculinity. The births resulting from unions of Italian, Spanish and French male immigrants with native-born Argentine females, show a higher masculinity than the births produced either by pure

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[1] *Dictionary of Statistics, op. cit.*, p. 383.

Argentine alliances or by pure alliances of any of these nationalities of Buenos Ayres. Further, the unions of Argentine males with females of foreign nationality provide a higher masculinity than is common among Argentines themselves.[1] These facts do not necessarily contradict the theory that any crossing of great racial groups diminishes masculinity, for all of the nationalities involved in this study are predominantly Mediterranean in blood. The theory is borne out by the statistics of the negroes in the United States, a large proportion of whom are of mixed blood. For taking as a basis the number of children of negro descent born during the year ending June 1, 1900 reported by the Twelfth Census, the females predominated, giving a negative masculinity of 99.8. Furthermore, the percentage of consanguineous marriage is probably high in the colored population.

The following table compiled from Mulhall[2] and other sources fails to show any correspondence between the percentage of first cousin marriage and the masculinity:

TABLE XI.

Country.	*Masculinity.*	*Per cent 1st cousin marriage.*	*Country.*	*Masculinity.*	*Per cent 1st cousin marriage.*
England	104.5	.75	Prussia	105.8	.67
France	105.3	1.26	U. S.[3]	104.9	1.00
Italy	107.0	.69	Jews[4]	107.6	2.30

It is impossible to obtain the actual masculinity ratio for the United States, for the Census gives the statistics for only

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[1] C. J. & J. N. Lewis, *Natality and Fecundity*, pp. 114-116.

[2] *Op. cit.*, p. 92.

[3] Masculinity, *Twelfth Census, Vital Statistics*, Pt. 1. Per cent of cousin marriage, estimated.

[4] Duesing, *op. cit.*, p. 24.

one year in ten and even then is untrustworthy on this point. In a few states birth registration is attempted but the figures thus obtained do not harmonize with the Census and the situation is not greatly improved.[1] The masculinity varies considerably in different parts of the country, and is generally higher in states where the rural population predominates. This fact agrees with European statistics which almost universally show a high masculinity in rural districts. Table XII, illustrates this point:

TABLE XII.

Masculinity in Scotland.[2]

Period.	*Principal towns.*	*Large towns.*	*Small towns.*	*Mainland rural districts.*	*Insular rural districts.*
1855–1861	——	——	——	105.6	106.6
1862–1871	——	——	——	105.9	105.6
1872–1881	105.0	105.6	106.1	105.3	108.0
1882–1891	105.1	105.6	105.5	105.5	108.7
1892–1901	104.7	104.6	104.9	105.2	107.1
Average	104.9	105.3	105.5	105.5	107.2

This would seem to bear out the theory that masculinity is affected by consanguineous marriage, for consanguineous marriage is more frequent in rural districts, and especially in insular rural districts. But unless consanguineous marriages can directly be shown to produce an excess of male births greater than the normal, such indirect evidence is valueless.

In the genealogical material previously considered, we have a sampling of the American population throughout its whole history, but the data so far collected are insufficient

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[1] Massachusetts *Census*, 103.1; Reg. 1891-1900, 105.6. Vermont *Census*, 108.1; Reg. 1890-1896, 105.9. Connecticut *Census*, 103.9; Reg. 1887-1891, 107.2. Rhode Island *Census*, 103.8; Reg. 1854-1901, 104.9.

[2] Lewis and Lewis, *op. cit.*, p. 128.

for more than an indication of what might be expected in further research along the same line. In the following table as before, the figures compiled from printed genealogies are separated from those obtained through correspondence and from miscellaneous sources. The "unrelated" marriages from genealogies, are marriages of brothers and sisters of the persons who have married first cousins, and their records were obtained from the same sources as those in the next previous category. The "children of first cousins" are the offspring of the first cousin marriages who married persons not related to themselves by blood. The last category includes distantly related marriages from correspondence and other sources and marriages between persons of the same surname whose relationship could not be traced.

TABLE XIII.

	Number	*Sex of Children.*			*Mascu-*
Marriages.	*fertile.*	*Male.*	*Female.*	*Unknown.*	*linity.*
1st cousin. Gene.	125	318	314	40	101
Unrelated. Gene.	629	1561	1559	64	100
Ch. of 1st cousins. Gene.	170	402	375	48	107
Other cousin. Gene.	301	736	666	15	111
1st cousin. Cor.	150	316	295	148	107
Ch. of 1st cousins. Cor	124	192	164	214	111
Miscellaneous	88	210	205	50	102
Total	1587	3735	3578	578	104.4

It is of course impossible to explain all the ratios in this table. Much variation is here due to chance, and a few additional cases might appreciably change any of the ratios. It will be noticed, however, that the two categories whose masculinity is most similar (100 and 101), are derived from cases taken from the same families and from the same environment, and differing only in that the first is closely consanguineous while the second is not. The third and fourth

groups, separated from the first two by at least a generation, and probably living in a different environment, differ greatly in masculinity from them. In the fourth group are included 1½, second, third, and a few even more distant cousins, all more distantly related than first cousins and taken from the same genealogies as these; yet the masculinity is much greater.

An analysis of the cases collected fifty years ago by Dr. Bemiss, of course without thought of masculinity, gives the following result:[1]

TABLE XIV.

		Sex of Children.		
Marriage.	*Number.*	*Male.*	*Female.*	*Masculinity.*
1st cousins and nearer	709	1245	1171	106.3
2d and 3rd cousins	124	264	240	110.0
All consanguineous	833	1509	1411	106.9
Unrelated	125	444	380	116.9

In the "Marriage of Near Kin," Mr. Huth gives a list of cases of consanguineous marriage collected by various persons from all over Europe.[2] He is free to say that they are worse than useless for the purpose for which they were collected, that of determining whether or not such marriages produce degeneracy, but in so far as the sex of the children is concerned they would not be biassed.

TABLE XV.

	Sex of Children.		
Marriage.	*Male.*	*Female.*	*Masculinity.*
1st cousins and nearer	165	164	100.
More distant cousins	95	73	131.

The unusual ratios are of course due principally to a "run of luck," and this table only shows that if consanguinity is

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[1] Bemiss, *Report on Influence of Marriages of Consanguinity*, pp. 420-423.

[2] Huth, *Marriage of Near Kin. Appendix.*

a determining factor in sex, its influence is negligible when a small number of cases is considered. It is interesting accordingly to note that of 100 children of incestuous unions and from uncle-niece and aunt-nephew marriages from Bemiss, Huth and other sources, the sex distribution was 48 males and 52 females, giving a negative masculinity of 92.

While in general the evidence presented in this chapter is somewhat conflicting, that which bears most directly upon the problem does not substantiate the hypothesis of Westermarck. The evidence in favor of the theory is all indirect and is open to other interpretations. It is hardly safe to go to the other extreme and to assert that consanguinity diminishes masculinity. The safest, and withal the most reasonable conclusion is that consanguinity in the parents has no appreciable effect upon the sex of the child.

CHAPTER IV

Consanguinity and Reproduction

The principal object of nearly every previous discussion of the intermarriage of kindred, has been either to prove or to disprove some alleged injurious effect upon the offspring. The writers who have treated the subject may be divided into three groups. First, those who have maintained in accordance with popular opinion that consanguinity *per se* is a cause of degeneracy or that in some mysterious way kinship of the parents produces certain diseases in the children. In this group Boudin in France and Bemiss in America are typical. Second, those who have flatly contradicted this position and have asserted that on the whole such marriages are beneficial, and that crossing is in itself injurious to the race. Huth is the chief exponent of this theory, although he admits that where degenerate conditions exist in the parents consanguinity in marriage may not be beneficial. The third group holds that cousin marriages in themselves, especially if not carried through too many generations, are not harmful, but that if any hereditary tendency to malformation or disease exists in the family of the parents, this tendency, inherited through both parents is strongly intensified in the offspring, and that consequently an increased percentage of the offspring of cousin marriage may be afflicted with hereditary diseases. This group includes a number of the later writers such as Feer and Mayet. Among the earlier discussions, those of Dally in France and

George H. Darwin in England take substantially this position. On the whole this theory seems to be the most reasonable one and with a few modifications it will be seen to account for all the facts herein presented.

It is undeniable that degeneracy does in some cases follow from the marriage of near kin, and probably with greater frequency than from non-related marriages. But it is likewise true that many of the world's greatest men have been the products of close inbreeding, sometimes continued through several generations. Frederick the Great of Prussia was the product of three successive cousin marriages between descendants of William the Silent,[1] and among his seven brothers and sisters at least three others ranked among the ablest men and women of the generation. Cousin marriage has always been frequent in the "first families of Virginia" which have produced a phenomenal percentage of able men. In fact, few persons who have traced their pedigrees back through a number of generations, do not find some names duplicated, as a result of cousin marriage.

The ills which have at one time or another been attributed to consanguineous marriage include nearly all those which cannot otherwise be satisfactorily accounted for. But with the progress of pathology the list has greatly been reduced: for instance, crétinism is now known to be a product

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[1] Woods, *Heredity in Royalty*, pp. 74-75. The Great Elector, a great-grandson of William the Silent, married his 1½ cousin, a granddaughter of William and also a great-granddaughter of Admiral Coligny. Frederick I married his second cousin, daughter of the Duchess Sophia of Brunswick, and a descendant of William. Frederick William I married his first cousin, Dorothea, granddaughter of Sophia, and also a descendant of William the Silent. Unfortunately the Hohenzollern line was continued by a mediocre brother of Frederick II, but through his sister, Queen Ulrica, the line of genius lasted still another generation to Gustavus III of Sweden.

of local conditions. The remaining counts in the indictment against consanguineous marriage may roughly be classified as: 1. The production of infertility, some forms of physical degeneracy, and deformity. 2. The production or aggravation of mental and nervous disorders. 3. The production of certain defects in the organs of special sense. These three divisions will be discussed separately.

I. INFERTILITY AND DEGENERACY

Although there has never been any considerable evidence for the first of these charges, it has frequently been repeated. Professor Montegazza of the University of Pavia collected data in regard to 512 cases of consanguineous marriage of which between 8 and 9 per cent were sterile, and with this basis he asserts that sterility is the only fact which can safely be deduced from his cases, since it cannot be hereditary.[1] But if in the nature of things absolute sterility is not inheritable, comparative infertility may be. And even then 8 or 9 per cent does not seem to be an excessively high proportion of sterility, especially if late marriages be counted. Boudin bases his assertion on this point on even less tenable grounds.[2] On the other hand some writers assure us that cousin marriages are even more prolific and less liable to sterility than the average.

The most important statistical investigation was made by G. H. Darwin.[3] From his genealogical data he compiled the following table:

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[1] See Darwin, "Marriages between First Cousins in England and Their Effects," *Journal of Statistical Society*, June, 1875, p. 178.

[2] Boudin, "Croisement des familles, de races et des espèces." In *Memoires de la Société d' Anthropologie*, vol. i, p. 518.

[3] *Op. cit.*, p. 181.

TABLE XVI.

Parentage.	*Number of marriages.*	*Average number sons to marriage.*	*Per cent sterile marriages.*	*Ave. no. sons to fertile marriage.*
Not consanguineous ..	217	1.91	15.9	2.26
Parents 1st cousins* ..	97 to 105	2.07 to 1.92	14.7 to 20.9	2.43
One parent offspring of 1st cousin marriages.	93	1.93	17.2	2.34

* Eight cases of doubtful fertility.

It will readily be seen that the conclusion is negative, since the variation is slight, but the higher fertility of the cousin marriages is interesting.

On the other hand de Lapouge quotes a case of a community founded two centuries ago by four families and populated almost entirely by their descendants, in which from 1862 to 1886 there were 273 marriages of which 63 were consanguineous and 26 were between first cousins. Among the non-consanguineous 3 per cent were uniparous, as against 7.95 per cent among the consanguineous. 7.5 per cent of the non-consanguineous were sterile as against 16 per cent of the consanguineous.[1] The importance of these percentages is impaired by the fact that they involve only five uniparous families and ten sterile ones, and that of these latter only five were sprung from first cousins.

It is almost impossible to get any accurate statistics of sterility from genealogies, for when no children are given in the record, there is always a strong possibility that there were children of whom the genealogist has no record. However, of 16 first-cousin marriages of which the record expressly stated " no issue," or where it was practically certain that no issue was possible, the average age of the brides was 34.3 years and that of the grooms was 39 years,

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[1] De Lapouge, *Les Selections Sociales*, p. 196.

showing that consanguinity could not have been the only cause of their sterility.

In regard to relative fertility the figures are reliable, but they fail to indicate any effect of consanguinity upon fertility, as will be noted in Table XVII.

TABLE XVII.

Parentage.	*No. of fertile marriages.*	*No. of children.*	*Ave. to fertile marriage.*
First cousin. Gene.	125	672	5.4
First cousin. Cor.	150	759	5.1
Double cousins and uncle-niece	9	39	4.3
Other consanguineous	333	1605	4.8
Non-related	676	3417	5.1
Ch. of 1st cousins	294	1395	4.7
All consanguineous	617	3075	5.0
All non-related	970	4812	5.0

The report of Dr. Bemiss, and the report of the Ohio commission[1] which he quotes, give the following figures:[2]

TABLE XVIII.

Parentage.	*No. of fertile marriages.*	*No. of children.*	*Ave. to fertile marriages.*
1st cousins or nearer*	660	3363	5.0
More distantly related	119	572	4.8
Non-consanguineous	125	837	6.7
Ohio consanguineous	155	1021	6.6
Ohio non-consanguineous	200	1375	6.9

* Includes double-cousins and uncle-niece marriages.

The comparatively low averages of the consanguineous marriages from Bemiss may easily be accounted for by the fact that the cases were highly selected so that nearly one-third of the children were in some way defective, and the

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[1] Appointed to ascertain the number of the deaf and dumb, blind, idiotic and insane within the State.

[2] See Bemiss, in *Trans. of Am. Med. Asso.*, vol. xi, 1858, pp. 420-425.

parents in many cases were far below the average in vitality. The "more distantly related" are in a still lesser degree representative of the class, since out of a greater possibility of choice a smaller number were chosen. The "non-consanguineous" were supposed to be near the average in vitality and fertility.

In Norway, according to Uchermann, the consanguineous and the non-consanguineous marriages are equally fertile, averaging 6.1 children per marriage;[1] and in a Black Forest village Tenckhoff found an average of 4.6 children to each consanguineous marriage as against 3.5 to each non-consanguineous marriage.[2]

In regard to the youthful death-rate among the offspring of consanguineous marriages, comparison with non-related marriages is more feasible. I have counted in each case all those children who are known to have died under the age of twenty. This age was taken for the sake of convenience, and to include all children indefinitely specified as having "died young." The results are given in Table XIX:

TABLE XIX.

Parentage.	*No. of*	*No. dying*	
(*Genealogies.*)	*Children.*	*under 20.*	*Per cent.*
First cousins	672	113	16.7
Other cousins	1417	211	14.9
Ch. of 1st cousins	825	103	12.5
Non-consanguineous	3184	370	11.6
(*Correspondence.*)			
First cousins	759	88	11.6
Other marriages	829	71	8.6

If the figures in Table XIX are to be accepted at their

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[1] Feer, *Der Einfluss der Blutsverwandschaft der Eltern auf die Kinder*, p. 12, *note*.

[2] *Ibid.*

face value, and there seems to be no good reason for not doing so in the genealogical cases at least, the youthful death-rate among the offspring of consanguineous marriages far exceeds the average. The average in the correspondence cases is undoubtedly too low, as many correspondents failed to report the deaths. From the fact that a comparatively large percentage of these were reported as defective, we should expect a higher death-rate than among the unbiased genealogical cases.

Dr. Bemiss found a very high death-rate among the children of consanguineous marriage, due partly to the fact that his cases were reported by physicians. He reports that of the offspring of marriages between first cousins and nearer relatives, 23 per cent "died young;" of the offspring of more remote consanguineous marriages, 16 per cent; and of non-related marriages 16 per cent. There is, therefore, a strong indication of lowered vitality as a result of consanguineous marriage.

A determination of even the approximate percentage of degenerate offspring resulting from marriages of consanguinity by direct inquiry is exceedingly difficult. The average human mind is so constituted as to exaggerate unconsciously the unusual in its experience. Herein lies the fallacy in the work of Dr. Bemiss. His material was "furnished exclusively by reputable *physicians* in various states," and of the 3942 children of consanguineous marriages in the cases thus furnished him, 1134 or 28.8 per cent were in some way "defective." Of these, 145 were deaf and dumb, 85 blind, 308 idiotic, 38 insane, 60 epileptic, 300 scrofulous and 98 deformed. It is evident that a physician in reporting such data to a physician would naturally give cases in which something pathological existed. Even if there were no conscious bias, such cases would be the ones with which a physician would be most likely to come in contact. Dr.

Bemiss himself recognized the possibility of this bias. To quote him:

> It is natural for contributors to overlook many of the more fortunate results of family intermarriage, and furnish those followed by defective offspring and sterility. The mere existence of either of these conditions would prompt inquiry, while the favorable cases might pass unnoticed. Contributors have been particularly requested to furnish without prejudice or selection all instances of the marriage of consanguinity within their various circles of observation, whatever their results.[1]

Yet he does not seem to believe that this bias seriously affects his conclusions.

In order as far as possible to avoid this bias, I sent my own circulars to genealogists and others who would naturally be more interested in the relationships than in pathological conditions. I asked, however, that all such results be noted. Among 722 children of first cousins I found 95 or 13 per cent who were defective in the sense in which Bemiss used the term. This is much nearer the actual percentage, but I have reason to believe, as will be seen hereafter, that even this percentage is far too high. A good illustration of the unconscious bias, which I tried to avoid is afforded by the reports on the cause of death among children of first cousins. Only 58 replies were given to this question, and of the 58 deaths 14 or one-fourth were either accidental or otherwise violent, while only one person was reported to have succumbed to pneumonia.

Many efforts have been made to investigate the occurrence of degeneracy in the offspring of consanguineous marriages, by studying communities in which such unions have

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[1] Bemiss, see *Trans. of Am. Med. Asso.*, vol. xi, 1858, p. 323.

been frequent, but the results are untrustworthy. Huth[1] quotes a number of instances where communities have lived for generations without crosses and with no apparent degeneracy, while other writers tell of high percentages of degeneracy. Smith's Island, Maryland, as has been said, seems absolutely free from serious congenital abnormalities, in spite of the great frequency of consanguineous marriages.

The causes of degeneracy are so varied, complicated, and obscure that even if consanguinity is a cause, there can be but few cases in which it is not complicated by other factors. But for the same reason that it is so difficult to prove any connection between consanguinity and degeneracy, it is equally difficult to disprove such a connection. It is very probable that from the mere operation of the law of heredity, there must be a comparatively large percentage of degenerates among the offspring of related parents, for defects which tend to be bred out by crossing are accentuated by inbreeding. This may be the reason for the disagreement among investigators of isolated communities. If an island, for instance, were settled by a small group of families in even one of which some hereditary defect was common, in the course of a few generations that defect would be found in a relatively large part of the population. While if the same island were settled by perfectly sound families, there would only be a remote chance of any particular defect appearing. Thus both classes of investigators may be perfectly conscientious, and yet arrive at diametrically opposite results. This theory is at least not to be contradicted by any facts which have come to light in the present investigation.

Some interesting points are brought up in Dugdale's well-

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[1] *Marriage of Near Kin*, chap. iv.

known study of the "Jukes."[1] This family, of about 540 persons living in northern New York, is descended from five sisters of unknown parentage, who were born between 1740 and 1770. The name "Juke" is fictitious, and is applied to all descendants of these five women, little attempt being made to trace the male lines on account of the excessive prevalence of illegitimacy.

In this family consanguineous marriages have been very frequent, perhaps partly because the Jukes came to be looked upon as pariahs and could not associate on equal terms with other members of the community. These marriages seem to have been fully as productive as the average of the family, and the offspring of as high a grade of intelligence. However, some individual cases are worthy of special mention as illustrative of intensification of hereditary tendencies.

(1) An illegitimate son of Ada Juke married a daughter of Bell Juke. He was a laborer, honest and industrious. She was reputable and healthy, and her father had a good reputation, but her mother had given birth to four illegitimate children before marriage, three of whom were mulattoes. Thus in this marriage of first cousins, three out of the four parents were of a low moral grade. As a result of this marriage three sons and three daughters were born. Two sons were licentious, intemperate and dishonest, two daughters were prostitutes, and the third became such after her husband was sent to prison. Only one son turned out fairly well. This son married a second cousin, a granddaughter of Delia Juke, and four out of his seven children were above the average of the family. His two elder brothers, however, married prostitutes, and became ancestors of criminals, prostitutes and syphilitics.[2]

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[1] R. L. Dugdale, *The Jukes.*

[2] *Ibid.*, Chart I.

(2) A legitimate son of Ada Juke, whose father was a thief and a pauper, married a daughter of Clara Juke, whose antecedents were fairly good. The husband had contracted syphilis before marriage and entailed it upon every one of his eight children. Five daughters became prostitutes and one was idiotic. The only daughter who bore a good reputation married a grandson of both Clara and Bell Juke. This was a remarkable case of selection. Both husband and wife were grandchildren of Clara, and so first cousins, and both were the offspring of first cousins, all within the Juke blood. But, on the other hand, both were the descendants of Clara, the best of the Juke sisters, and both were the best of the progeny of their respective parents. The only serious taint was the secondary syphilis which the wife had inherited from her father. Six children were born, two males and four females. The eldest son was at 31 "laborer, industrious, temperate;" the eldest daughter "good repute, temperate, read and write;" second daughter, "harlot;" third daughter "good repute, temperate;" and the two youngest are given simply as "unmarried." This family seems to have had as high an average mentally and morally as any family in the whole tribe, only one in six being distinctly immoral. In the next generation, the eldest son had two children, the eldest daughter four, and the third daughter, who married a first cousin, had one child. It would be of great interest to know more of this last marriage, the third generation of consanguinity in marriage, and the fourth first-cousin marriage in three generations, but at the time the book was written the parties were still in their early twenties.[1]

Mr. Dugdale makes the following "tentative inductions." 1. Boys preponderate in the illegitimate lines. 2. Girls

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[1] Dugdale, *op. cit.*, Chart II.

preponderate in the intermarried branches. 3. Lines of intermarriage between Jukes show a minimum of crime. 4. Pauperism preponderates in the consanguineous lines. 5. In the main, crime begins in progeny where Juke blood crosses X blood. (Anyone not descended from a Juke, is of "X blood"). 6. The illegitimate lines have chiefly married into X.[1] The third and fourth inductions might indicate that a lowered vitality of the consanguineous lines changed a tendency toward crime into the less strenuous channel of pauperism, but I cannot find in Mr. Dugdale's charts any sufficient basis for the induction. It is true that the most distinctively pauper line is consanguineous, but it is less closely inbred than the "semi-successful" branch. As to the fifth induction, a close examination of the data shows clearly that in nearly every case where an X marriage occurred, it was with a person of a distinctly immoral or criminal type. Cousin marriage has also been frequent in the middle western counterpart of the Jukes, the "Tribe of Ishmael."[2]

A more recent study of hereditary degeneracy is that of the "Zero Family" in Switzerland.[3] Here the first degenerate was the product of two successive consanguineous marriages, both with a branch tainted *with insanity*. In spite of his bad ancestry he lived to the age of 106 years. He married an Italian woman of questionable antecedents, and was the father of a large family. Three hundred and ten of his descendants are mentioned, of whom many are still young. Of these 310, 74 died in early childhood, 55 are or were vagabonds, 58 were weak-minded or idiotic and 23

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[1] Dugdale, *op. cit.*, p. 16.

[2] McCulloch, *Tribe of Ishmael.*

[3] Joerger, "Die Familie Zero." Reviewed by Gertrude C. Davenport, in the *American Journal of Sociology*, Nov., 1907.

were criminals. Fifty-two were of illegitimate birth. Although some are counted in more than one category, the record is appalling. In this family however, the marriages were nearly all with foreign women, and the effect of consanguinity was only the intensification of the neurosis in the first two generations.

Dr. Bemiss found that 300 or 7.7 per cent of the offspring of consanguineous marriages were subject to scrofula.[1] This is a disease which is almost universally recognized as hereditary, and which we should therefore expect to find intensified by double heredity. But 7.7 per cent is obviously too high; otherwise most of the scrofulous must be the offspring of marriages of kindred. About one per cent of the children of my own correspondence cases were reported as scrofulous. And while the United States Census reports but 3.9 per cent of the blind as the offspring of consanguineous marriages, the percentage of the blind from scrofula is 6.1.[2] The blind from scrofula of consanguineous parentage were 2.8 per cent of all the blind of consanguineous parentage, while all the blind from scrofula were 1.8 per cent of all the blind. Consanguinity, then, seems appreciably to intensify scrofula, but there is no indication that scrofula is ever caused by parental consanguinity.

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[1] Bemiss, see *Trans. of Am. Med. Asso.*, vol. xi, 1858, p. 420.

[2] *The Blind and the Deaf.* Special Report of 12th Census, 1906.

CHAPTER V

CONSANGUINITY AND MENTAL DEFECT

IDIOCY, perhaps more than any other disease or defect, has long been connected in the popular mind with the marriage of cousins. This fact is not surprising when we consider that until very recent times idiots were looked upon with a kind of superstitious awe, and the affliction was supposed to be a curse of God. For this reason, when idiocy did follow consanguineous marriage as it sometimes would, it was believed to be the fit punishment of some violation of divine law. Insanity also frequently has been attributed to consanguineous marriage, but not so frequently as idiocy, since its occurrence later in life is not so obviously connected with pre-natal conditions.

The terminology of mental and nervous disorders has been so loosely applied that some definition may be necessary. By the term " idiocy," is meant a condition of undeveloped mentality. Idiocy exists in various degrees, from the complete absence of intellectual faculties to a condition of mere irresponsibility in which the subject is capable of self-help, and sometimes of self-support under the careful guidance of other. Under the generic term " idiot " may be included the " complete idiot," the imbecile, the " feeble-minded " and the " simpleton," all of whom suffer in a greater or less degree from arrested mental development.

Insanity, on the other hand, is a disease which destroys or clouds an intellect which has once been developed.

It is true that certain conditions of idiocy and imbecility do resemble that phase of insanity known as dementia—a reversion to the original mental state of childhood — in reality a form of second childhood. But the states are not identical, although one may lapse into the other. One is defect, the other disease; the imbecile in the former being the counterpart of the dement in the latter, just as the moral imbecile is the analogue of the paranoiac.[1]

Of the strong inheritability of idiocy there can be no doubt. Dr. Martin W. Barr of the Pennsylvania Training School for Feeble Minded Children has published an etiological table embodying the results of a careful examination of 4050 cases of mental defect. Of these, 2651 or 65.45 per cent resulted from causes acting before birth, including 1030 or 25.43 per cent with a family history of idiocy and imbecility, and 529 more (13.06 per cent) with a family history of insanity, epilepsy and minor neuroses. Dr. Barr gives many instances illustrating the heredity of imbecility, especially where both parents were imbeciles, and had imbecile relatives. One case in particular forcibly illustrates the disastrous results of the marriage of such unfortunates. It is taken from the reports of the Connecticut Lunacy Commission:

> In one instance, where a pauper female idiot lived in one town, the town authorities hired an idiot belonging to another town, and not then a pauper, to marry her, and the result has been that the town to which the male idiot belongs has for many years had to support the pair and the three idiot children.[2]

Neuroses may remain latent for a generation and reappear

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[1] Barr, *Mental Defectives*, p. 18.

[2] *Ibid.*, p. 99.

in the grandchildren of the person affected, or the latent tendency may never reappear unless some disturbing factor such as scarletina, meningitis or other acute disease attacks the weak spot. This possibility suggests that the influence of heredity may be vastly greater than the etiological tables would indicate. The apparent causes may be only agents which assist in developing the evil really engendered by an inheritance of imbecility.

It is not at all certain that there is any well marked boundary line between genius and some forms of imbecility. Many quite irresponsible idiots have marvelous verbal memories, and can repeat parrot-like, page after page of books of which they have no comprehension. Dr. Barr tells of cases of prodigies, musical, mathematical and mechanical, who except in their specialty were almost totally deficient mentally.[1] Many of the world's most brilliant musicians, mathematicians and even military leaders have been men of one-sided mental development, whose ability in other lines was so slight that they were little better than imbeciles, and it is not at all surprising that their children are sometimes truly idiotic.

The best writers of the present day no longer recognize consanguinity as a cause *per se*, of idiocy. The heredity of neuroses, however, is so strongly established that few would dispute the proposition that where the morbidity is inherited through both parents it appears more frequently and in a more marked degree than where one parent is entirely free from taint. This is what occurs when a consanguineous marriage takes place between descendants of a neurotic family. The percentage of idiotic children would then be somewhat higher from consanguineous marriages than from the average marriage purely through the action of the laws of heredity.

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[1] Barr, *op. cit.*, p. 301 *et seq.*

Dr. Barr finds 49 out of 4050 cases of idiocy or 1.21 per cent, in which there was a family history of consanguinity. This is little higher than the average frequency of first cousin marriage, and an analysis of 41 of these cases does not show one case that can be attributed to consanguinity alone. To quote: "Two were the result of incestuous connection—one of brother and sister, the other of father and daughter, and in the others there was an undoubted history of grave neuroses."[1] "Beach and Shuttleworth find in the consideration of their 100 cases (out of 2,380 idiots), giving 4.2 per cent (of consanguineous parentage) that the bad effects are due rather to the intensification of bad heredity common to both parents."[2]

Dr. Arthur Mitchell examined all idiots in nine counties of Scotland and found that 42 out of 519 or 8.1 per cent of whom the parentage was known, were children of first cousins.[3] Dr. Down found 46 out of 852 or 5.4 per cent to be children of first cousins.[4] Dr. Grabham of the Earlswood Idiot Asylum in Surrey, England, stated that 53 out of 1388 patients were the offspring of first cousins. The facts, he adds, were obtained from the parents and are "therefore tolerably trustworthy."[5] Other investigations give percentages as follows: Kerlin, 7; Rogers, 3.6; Brown, 3.5 and C. T. Wilbur, 0.3.[6]

The earlier American writers, Drs. Howe and Bemiss, believed that consanguinity was a cause of idiocy. Dr. Howe inquired into the parentage of 359 idiots and found that in 17 families the parents were nearly related; in one of these

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[1] Barr, *op. cit.*, p. 94.

[2] *Ibid.*, p. 109.

[3] Darwin, see *Jour. Stat. Soc.*, p. 173.

[4] Huth, *Marriage of Near Kin*, pp. 210-211.

[5] Darwin, *op. cit.*, p. 166.

[6] Barr, *op. cit.*, p. 109.

cases there were 5 idiotic children; in 5 families there were 4 idiots each; in 3 families 3 each; in 2 families 2 each; and in 6 families 1 each. In all 17 families there were 95 children of whom 44 were idiots, 12 were scrofulous and puny, 1 was deaf, 1 dwarf—58 in low health or defective, and only 37 fairly healthy. These of course are selected cases and do not indicate at all, as Dr. Howe supposed, that consanguinity was the cause of the disasters. He adds that in each case one or both of the parents were either intemperate or scrofulous, and that there were also other predisposing causes.[1] Dr. Bemiss found that 7.8 per cent of his 3942 children of consanguineous marriages were idiots, while but 0.7 per cent of the children of non-consanguineous parentage were idiotic.[2] A more detailed examination reveals the fact that in a large number of these, one or both of the parents were mentally defective. For example, in a marriage of double cousins the wife was "feeble minded" and the six children were of inferior mentality. In a case of first-cousin marriage the wife became insane and two of the children were idiotic. In a case of the marriage of cousins, themselves the offspring of cousins the husband was a hypochondriac, and seven children idiotic. In another marriage of the same class both parents were feeble-minded and the children idiotic. These are simply taken at random, and many others might be given. When we find also that in a majority of cases no report is given of the ancestry, it is very obvious that consanguinity alone could not have been the cause of any large proportion of the 308 cases of idiocy in the Bemiss report.

My own investigations show that out of 600 children of first cousin marriage (from correspondence) 26 or 4.3 per cent are mentally defective—10 are reported as "idiots,"

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[1] Barr, *op. cit.*, p. 111.

[2] Bemiss, *op. cit.*, p. 420.

13 as "weak-minded" and 3 as "imbeciles." In at least five of these cases there is evidence of bad heredity, in two others the father was intemperate and in two more causes acting after birth are mentioned.

The statistics of the insane and idiotic in Prussia presented by Mayet clearly indicate the large part which heredity plays in the production of mental disorders. Tables XX and XXI set forth the most important results of his work. Mayet considers a case hereditary if any near relative of the subject suffered from mental or nervous disorder, or was intemperate, suicidal, criminal or eccentric.[1]

TABLE XX.

	No. of Cases.	*Percentage hereditary.*
1. Simple Insanity	102,097	31.7 = 100
Consanguineous parentage	664	69.0 = 218
Parents cousins	595	68.1 = 215
Parents uncle and niece	66	77.3 = 244
2. Paralytic Insanity	22,936	17.6 = 100
Consanguineous parentage	95	45.3 = 257
Parents cousins	87	44.8 = 255
Parents uncle and niece	8	75.0 = 426
3. Epileptic Insanity	14,067	25.6 = 100
Consanguineous parentage	79	53.2 = 208
Parents cousins	70	50.0 = 195
Parents uncle and niece	9	66.7 = 261
4. Imbecility and Idiocy	16,416	28.7 = 100
Consanguineous parentage	237	43.0 = 150
Parents cousins	211	43.1 = 150
Parents uncle and niece	26	38.5 = 134

Table XXI gives the proportion of the mentally defective who are the offspring of consanguineous marriages. The

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[1] Mayet, *Verwandtenehe und Statistik*, quoted by Feer, *Der Einfluss der Blutsverwandschaft der Eltern auf die Kinder*, p. 13.

term "cousin" in both these tables probably means first cousins. It will be remembered that Prussian statistics of consanguineous marriages are very imperfect, but that at least 6.5 in every thousand are consanguineous (first cousins or nearer).

TABLE XXI.[1]

Parentage of Mental Defectives in Prussia.

	Consanguineous.	*Cousins.*	*Uncle and Niece.*
1. Insanity (simple)	6.5*	5.8*	.64*
Hereditary	14.2	12.5	1.6
Not hereditary	3.0	2.7	.22
2. Paralytic Insanity	4.1	3.8	.35
Hereditary	11.1	9.6	1.48
Not hereditary	2.9	2.5	.11
3. Epileptic Insanity	5.6	4.9	.64
Hereditary	11.7	9.9	1.57
Not hereditary	3.5	3.2	.29
4. Idiocy and Imbecility	14.4	12.8	1.58
Hereditary	21.6	19.3	2.12
Not hereditary	11.5	10.2	1.37

*Per thousand.

From these tables we may infer that consanguinity influences idiocy far more than it does insanity, but it is not entirely clear why the number of hereditary cases should be relatively smaller among the idiotic. Since insanity is more likely to have some more definitely assignable cause than idiocy, we should expect the percentage due to heredity to be lower and consequently the influence of consanguinity less.

It is generally admitted that a tendency toward insanity is inheritable, and it seems probable that this tendency as well as other neuroses may be intensified through double

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[1] Feer, *op. cit.*, pp. 13-14.

heredity. A case in point can be found in the Shattuck genealogy.[1] For four generations in the S. family there is no indication of neurosis. The average number of children to a family had been eight, few children died young and all were prosperous farmers. But in 1719 J. S. married E. C. and their son Z. S. is thus described: "He was sometimes subject to depression of spirits; and some peculiar traits of character in a few branches of his family seem to have originated with him." He married A. C., a niece of his mother. They both lived to be over 80 and had ten children, of whom three were insane; only six married, and of these only two are known to have left surviving children. One of these a daughter, S. S., married E. S., a nephew of her father, and himself the offspring of a second cousin marriage within the S. blood. E. S. and S.S. had five children, all of whom married, and there is no further mention of insanity. We may suppose, then, that the C. stock was neurotic, and that a consanguineous marriage within that stock, although of the S. surname, intensified the tendency into insanity, but with a further infusion of the normal S. blood the morbidity was eliminated. It is very evident that the heredity and not the consanguinity was the cause of these three cases of insanity.

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[1] *Shattuck Memorials*, p. 118.

CHAPTER VI.

CONSANGUINITY AND THE SPECIAL SENSES

THE most important source for this chapter is the special report on the Blind and the Deaf in the Twelfth Census of the United States.[1] This report was prepared under the direction of Dr. Alexander Graham Bell, as Expert Special Agent of the Census Office.

The enumerators of the Twelfth Census reported a total of 101,123 persons as blind, and to each of these Dr. Bell addressed a circular of inquiry. By this method he obtained verified returns of 64,763 cases of blindness in continental United States or 85.2 per 100,000 of the total population. In the same way he obtained data in regard to 89,287 persons with seriously impaired powers of hearing, or 117.5 per 100,000 of the total population.

In each case the following questions among others were asked: "Were his (or her) parents first cousins? If not first cousins were they otherwise related by blood to each other, before their marriage? Were any of his relatives blind? If yes, what relatives? (Father, mother, grandparents, brothers, sisters, uncles, aunts, and how many of each, so far as known)." The results of this inquiry give us the best and most reliable statistical material which has ever been compiled on any phase of the problem of consanguineous marriage. The investigation of the deaf was similar to that of the blind, but even more complete.

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[1] U. S. Census, 1900, *Special Report on the Blind and the Deaf.*

1. The Blind. The question as to the relationship of the parents was answered in 56,507 cases, in 2,527 or 4.47 per cent of which the parents were reported as cousins. Of the 57,726 who answered the question in regard to blind relatives, 10,967 or 19 per cent replied in the affirmative.[1] The blind relatives were divided into two groups: (a) blind brothers, sisters or ancestors, and (b) blind collateral relatives or descendants. Table XXII concisely expresses the results most fundamental for this study.

TABLE XXII.

Consanguinity of Parents.	Totals.	Having blind relatives. Class (a).*	Having blind relatives. Class (b).*	Having no blind relatives.	Not Stated.
The blind	64,763	8,629	2,338	46,759	7,037
Totally blind	35,645	4,378	1,215	26,349	3,703
Partially blind	29,118	4,251	1,123	20,410	3,334
Parents cousins.—The blind	2,527	844	149	1,456	78
Parents cousins.—Totally blind	1,291	435	78	739	39
Parents cousins.—Partially blind	1,236	409	71	717	39
Parents not cousins.—The blind	53,980	7,395	2,095	43,368	1,122
Parents not cousins.—Totally blind.	29,892	3,720	1,090	24,541	541
Parents not cousins.—Partially blind	24,088	3,675	1,005	18,827	581
Consanguinity not stated.—The blind	8,256	390	94	1,935	5,837
Consanguinity not stated.—Totally blind	4,462	223	47	1,069	3,123
Consanguinity not stated.—Partially blind	3,794	167	47	866	2,714

*Symbols for Blind Relatives—(a) blind brothers, sisters or ancestors; (b) blind collateral relatives or descendants.

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[1] U. S. Census, 1900, *op. cit.*, p. 16.

Of the 2527 blind persons whose parents were cousins, 993 or 39.3 per cent have blind relatives, 33.4 per cent having blind brothers, sisters or ancestors, and 3.9 per cent having blind collateral relatives or descendants. And 9 per cent of the blind who have blind relatives are of consanguineous parentage, while but 3.1 per cent of the blind who have no blind relatives are the offspring of cousins. These figures alone indicate a decided intensification of blindness through consanguinity, although it should be remembered that a relationship "works both ways," so that when a brother has a blind sister, the sister would have a blind brother. This fact has probably diminished the apparent number of sporadic cases of blindness.

Considered with reference to the degree of blindness the table shows that 1291 or 51.1 per cent of the blind of consanguineous parentage are totally blind, and 1236 or 48.9 per cent are partially blind. Among those whose parents were not cousins, 55.4 per cent were totally and 44.6 per cent were partially blind.

Of the 2527 blind of consanguineous parentage, 632 or 25.0 per cent were congenitally blind, of whom 350 or 55.4 per cent also had blind relatives of the degrees specified. Not counting those who did not answer the question in regard to blind relatives, we have 615 cases of which 51.5 per cent had blind relatives of class (a), and 5.4 per cent blind relatives of class (b). Taking the 53,980 blind whose parents were not so related the number of congenitally blind was 3666 or but 6.8 per cent, of whom 1023 or 27.9 per cent had blind relatives. Omitting as before the "blind relatives not stated," we have 23.4 per cent who had blind relatives of class (a), and 4.3 per cent relatives of class (b).

On the hypothesis that consanguinity in the parents intensifies a tendency toward blindness we should expect to find among the congenitally blind a larger proportion of

consanguineous parentage than among those blind from specific causes. In Table XXIII a general classification of the causes of blindness is given together with the consanguinity of parents. Specific causes in which the percentage of consanguinity differs in a marked degree from the average, are given parenthetically.

TABLE XXIII.

Cause of Blindness.	Total.	Consanguinity of Parents.			Percentages.		
		Cousins.	Not cousins.	Not stated.	Cousins.	Not cousins.	Not stated.
Total	64,763	2,527	53,980	8,256	3.9	83.4	12.7
Opacity of the eye	33,930	1,000	28,797	4,133	2.9	84.9	12.2
a. Causes affecting cornea	11,380	444	10,016	920	3.9	88.0	8.1
(1) Measles	1,451	73	1,267	111	5.0	87.4	7.6
(2) Scrofula	1,165	71	1,026	68	6.1	88.1	5.8
b. Causes affecting iris	1,307	33	1,093	181	2.5	83.6	13.9
c. Causes affecting lens	11,769	228	9,467	2,074	1.9	80.4	17.7
d. Other causes	9,474	235	8,221	1,018	2.5	86.8	10.7
Nervous apparatus affected	7,944	276	6,980	688	3.5	87.8	8.7
Unclassified	14,885	938	12,463	1,484	6.3	83.7	10.0
(1) Congenital	4,728	632	3,666	430	13.4	77.5	9.1
(2) Other causes	10.157	306	8,797	1,054	3.0	86.6	10.4
Unknown	8,004	313	5,740	1,951	3.9	71.7	24.4

To quote from the Report:

> The only specific causes, other than congenital, to which is due a greater proportion of the total cases of blindness among those whose parents were cousins than among those whose parents were not related, are: Catarrh (parents cousins 28.1,

> parents not cousins 8.7 per 1,000), scarlet fever (parents cousins 10.7, parents not cousins 10.1 per 1,000), scrofula (parents cousins 28.9, parents not cousins 19 per 1,000), and measles (parents cousins 28.9, parents not cousins 23.5 per 1,000). The difference in these proportions is but slight, and the relative number of cases of blindness attributed to each of the other causes is greater among those whose parents were not related.[1]

It will be noted that the greatest proportion is in the case of scrofula.

Since it is probable that a part of those who did answer the question as to consanguinity are in fact the offspring of cousins, the percentage in each case should be somewhat increased. Allowing for these the same proportion as for those who did answer the question we should have of all the blind 4.47 per cent as the offspring of cousins; of the totally blind 4.14 per cent and of the partially blind 4.88. While of the congenitally blind we should have 14.7 per cent as offspring of cousins.

It is interesting to note in this connection that in 1900, Dr. Lee Wallace Dean, of the University of Iowa examined the 181 blind children in the Iowa College for the Blind, and found that 9 or nearly 5 per cent were the offspring of first cousin marriages.[2] Dr. Dean cintinues,

> If we exclude from the list those blind children who were blind because of blennorrhea neonatorum, sympathetic opthalmia, trachoma, etc., and consider only those who suffered because of congenital conditions, we should find that 14 per cent were the result of consanguineous marriage of the first

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[1] U. S. Census, 1900, *op. cit.*, p. 17.

[2] *Effect of Consanguinity upon the Organs of Special Sense*, p. 4.

degree. . . . Among the pupils who have entered the college since 1900 the percentage is about the same.

This was written in 1903, three years before the publication of Dr. Bell's report.

Statistics from foreign sources give even larger percentages of the blind as the offspring of consanguineous marriage. Dr. Feer quotes fourteen distinct investigations of the etiology of retinitis pigmentosa, embodying in all 621 cases, of which 167 or 27 per cent were the offspring of consanguineous parents.[1] Retinitis pigmentosa is perhaps more generally attributed to consanguineous marriage than any other specific disease of the eye, and it is to be regretted that the Census report does not give any data in regard to this cause. Retinitis pigmentosa in known to be strongly inheritable, as is albinism and congenital cataract.

Looking now at the other side of the problem, that of the probability of consanguineous marriages producing blind offspring, we have as our data the 2527 blind whose parents were cousins, and a conservative estimate which may be made from the data in Chapter II that 1,000,000 persons in continental United States are the offspring of cousins within the degrees included in the Census report.[2] In the general population 852 per million are reported as blind, and 63 per million as congenitally blind. The actual figures for the offspring of cousin marriages are 2527 per million for all blind and 632 per million for the congenitally so. In other words only 0.25 per cent of the offspring of cousin marriages are blind and only 0.05 per cent are con-

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[1] *Der Einfluss der Blutsverwandschaft der Eltern auf die Kinder*, p. 14.

[2] From 1½ to 2 per cent of all marriages were found to be between cousins within the degree of second cousins, and cousin marriages were found to be normally fertile.

genitally blind. Although the probability that a child of related parents will be born blind is ten times as great (632 per million vs. 63 per million) as when the parents are not related, the numbers are so small that there seems to be very little basis for a belief that consanguinity does more than to intensify an inherited tendency, especially since over one half of the congenitally blind of consanguineous parentage are known to have blind relatives.

2. The Deaf. The extent to which the connection between consanguineous marriage and deaf-mutism has been studied is indicated by a table given by Mr. Huth, in which are set forth the results of fifty distinct investigations.[1] In this table the percentages of deaf-mute offspring of consanguineous marriage to the total number of deaf-mutes investigated, varies from 30 per cent to none at all. Of these studies not more than ten or eleven have the slightest statistical value, and four of these—the most reliable—are from the reports of the Census of Ireland in the years 1851, 1861, 1871 and 1881.

The Irish censuses of 1891 and 1901 give similar data, though not so detailed as in 1871 and 1881. Thus we have in these reports a census inquiry into a phase of the consanguineous marriage problem extending over the period of six successive censal years. Although we can hardly suppose that these figures are accurate in all respects, they throw a great deal of light upon the problem, and are worth quoting in some detail. The tables as given by Mr. Huth contain a number of errors of detail, the correction of which changes the results materially.[2]

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[1] *Marriage of Near Kin*, p. 229.

[2] In a subsequent article Mr. Huth corrects some of these errors. See "Consanguineous Marriage and Deaf-mutism," *The Lancet*, Feb. 10, 1900.

[illegible]

[illegible]

[illegible]

[illegible]

TABLE XXIV.

Censal year.	Total population.	Congenital deaf-mutes.					
					Parents cousins.		
		Number.	Number per million.	Average number to a family.*	Number.	Per cent.	Average number to a family.*
1851†.....	6,574,278	4,127	628	——	242	5.86	1.66
1861......	5,798,967	4,096	706	1.22	362	8.84	1.72
1871......	5,412,377	3,503	647	1.30	287	7.35	1.76
1881......	5,174,836	3,163	611	1.32	191	6.04	1.69
1891......	4,706,448	2,570	546	1.40	297	11.56	1.92
1901......	4,456,546	2,179	489	1.40	249	11.43	1.73

* From Table XXV. † 1851 data from Huth, "Consanguineous Marriage and Deaf-mutism," *The Lancet*, 1900.

Table XXIV summarizes the most important points in the Irish data. It will be seen that while there has been an absolute diminution in the number of deaf-mutes in Ireland with the decrease in population, there has been a relative increase of deaf-mutism. There are two possible explanations for this phenomenon, both of which may have operated in part; first that in the great emigration the deaf-mutes have been left behind, and second that with the introduction of improved methods of census taking, the returns are more complete than a half century ago. Mr. Huth believes that there is still room for improvement in Irish census methods, and thinks there is reason to believe that in the enumeration of the deaf all children born deaf in a family are included whether living or not.

Since Ireland is strongly Roman Catholic, the proportion of consanguineous marriages is probably small, so that the percentage of deafmutes derived from consanguineous marriages, varying from 5.86 to 11.56 is very much greater than the percentage of these marriages in the general population. The average number of deaf children to a family in Table XXIV varies less than any other part of the table, and clearly shows a much higher average number of deaf children where the parents were cousins. They reveal the interesting fact that the occurrence of two or more deafmutes in a family is more than twice as probable where the parents are related as where they are not. Table XXV still better illustrates this point. Of the families where there was but one deaf-mute, only 4.3 per cent were the offspring of cousin marriages; where there were two in a family 12.9 per cent were of consanguineous parentage; three in a family, 13.3 per cent; four in a family, 19.0 per cent; more than four in a family, 21.1 per cent.

TABLE XXV.

Number of Congenital Deaf mutes to a Family in Ireland.

Year.	Parentage.	Families in which deaf-mutes numbered.										
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1851	Parents cousins	127	45	20	10	5	2	..	1	..	...	...
1871	Parents cousins	91	38	24	5	3	1	1	..	..	...	...
1881	Parents cousins	63	30	13	6	1	..	..	..	..	...	...
1891	Parents cousins	82	38	19	9	1	3	1	2	..	...	...
1901	Parents cousins	79	34	23	7	1	..	1	..	..	...	...
1851	All families *	2963	347	158	35	13	5	..	1	..	...	...
1871	All families *	2460	305	167	47	20	5	1	..	..	...	...
1881	All families *	2080	281	162	39	18	6	..	..	..	1	...
1891	All families *	1473	273	134	40	12	6	1	2	..	...	1
1901	All families *	1219	231	122	34	10	4	2	..	..	...	...

* Number of the "Deaf and Dumb" to a family, "as far as could be ascertained."

In 1871 and 1881 the inquiry was more minute and the degrees of consanguinity were specified. Mr. Huth quotes some of the figures for these years, probably derived from the same sources as Table XXVI, and comments as follows: "An examination of this table will show that the statistics so much relied upon as proving the causation of deaf-mutism by consanguineous marriages show nothing of the sort. In 1871 fourth cousins produced more deaf-mutes per marriage than any nearer relationship. In 1881 third cousins produced more than any nearer relationship." [1] Mr. Huth forgets that he is basing these statements on five and nine families respectively, and does not take into consideration the probability that if the returns are biased, as he suspects, this bias would affect the more distantly related, relatively more than the first cousin marriages, for the same reason that this would be true of the cases collected by Dr. Bemiss.[2] Combining the figures of the two censal years helps to correct these averages, and the distantly related show approximately the same average as the first cousin marriages in spite of the vastly greater selection which must have obtained in the distantly related cases.

In Table XXVI it will be seen that 52.5 per cent of the deaf-mute offspring of consanguineous parents were the offspring of first cousin marriages. On the assumption that this percentage is fairly typical of each set of returns we may say that from three to six per cent of the Irish deaf-mutes are the offspring of first cousin marriages. If, then, the proportion of first cousin marriages is no greater than in England, the percentage of deaf-mute offspring is several times as great as in the average non-related marriage.

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[1] Huth, *Marriage of Near Kin*, p. 227.

[2] *Cf. supra*, p. 42.

TABLE XXVI.

Consanguinity of Parents.	1871.			1881.			1871 and 1881.		
	Number of marriages.	Number of congenital deaf-mutes.	Average per marriage.	Number of marriages.	Number of congenital deaf-mutes.	Average per marriage.	Number of marriages.	Number of congenital deaf-mutes.	Average per marriage.
First cousins	72	128	1.78	74	123	1.66	146	251	1.72
Second cousins	50	89	1.78	29	46	1.58	79	135	1.71
Third cousins	24	40	1.67	9	21	2.33	33	61	1.85
Fourth cousins	5	11	2.20	1	1	—	6	12	2.00
Fifth and sixth cousins	12	19	1.58	not stated			12	19	1.58
Total................	163	287	1.76	113	191	1.69	276	478	1.73
No relationship *	2,842	3,609	1.27	2,474	3,229	1.31	5,316	6,838	1.29
Grand total..........	3,005	3,896	1.30	2,587	3,420	1.32	5,592	7,316	1.31

* See Table XXV.

In Scotland Dr. Arthur Mitchell made inquiry of the superintendents of a number of deaf-mute asylums, and found that of 544 deaf-mutes, 28 were the offspring of 24 consanguineous marriages.[1] There were 504 families represented in all, so that the average per family was 1.17 among the consanguineous to 1.07 among the non-consanguineous.

In Norway, according to Uchermann, while 6.9 per cent of all marriages are consanguineous within and including

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[1] Huth, *op. cit.*, p. 226.

the degree of second cousins, and in single cantons the percentages range as high as 31.0, only in one single district does the number of the deaf-mutes harmonize with that of the marriage of cousins. The district of Saeterdalen has the greatest number of consanguineous marriages (201 out of 1250), but not a single case of deaf-mutism. Hedemarken, which has the fewest consanguineous marriages has a great many deaf-mutes. Where deaf-mutism exists it seems to be intensified by consanguinity, but where it is not hereditary it is not caused by consanguinity. Of the 1841 deaf-mutes in Norway, 919 were congenitally deaf, and of these 212 or 23 per cent were of consanguineous parentage.[1]

Dr. Feer gives a table containing the results of a number of studies of deaf-mutism, which shows an average of 20 per cent as of consanguineous origin. Four investigations give the number of children to a family. Table XXVII from Feer seems to indicate that the Irish census is fairly accurate at this point.[2]

TABLE XXVII.

Average Number of Children to a Family.

Observer.	*Consanguineous marriages.*	*"Crossed" marriages.*
Huth (Irish Census)....	1.68	1.17
Wilhelmi................	1.71	1.26
Mygind..................	1.53	1.20
Uchermann...............	1.41	1.19

In the American Census the instructions to enumerators have been so diverse that statistics of the deaf have been very poor until recent years. Not until the Twelfth Census was the inquiry put upon a really scientific basis.

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[1] *Les Sourds-muets en Norvège.* Quoted by Feer, *Der Einfluss der Blutsverwandschaft der Eltern auf die Kinder*, p. 22.

[2] Feer, *op. cit.*, p. 22.

This reform, as also the more intelligent attitude of the American people in general towards the affliction of deafness, is due largely to the work of Dr. Alexander Graham Bell. An enumeration of Dr. Bell's services directly, and through the agency of the Volta Bureau, in this cause, cannot be given here. For our purpose the most important of his contributions is embodied in the Special Report of the Twelfth Census of the United States already referred to.

As in the investigation of the Blind, the circular letter sent to each person reported by the enumerators as deaf contained questions in regard to parentage and the existence of deaf relatives. It is unfortunate that in these returns it is impossible to distinguish between degrees of relationship, but in such an extensive compilation it was doubtless impracticable to attempt to unravel the intricacies of consanguinity. Judging from the returns of the Census of Ireland we may assume that about half of the cases returned as "cousins" were first cousins.

The replies to the inquiry as to deaf relatives were more carefully analyzed, and were divided into four groups, which are referred to throughout as (a), (b), (c) and (d) relatives. These groups are: (a), deaf brothers, sisters or ancestors; (b), deaf uncles, aunts, cousins or other relatives not (a), (c) or (d); (c), deaf children, (sons or daughters); (d), deaf husbands or wives. Thus a large proportion of the hereditary cases would be included in the first two categories, (a) and (b).[1]

The causes of deafness are given in detail, but as might be expected the returns are not as definite or as accurate as we should desire. The causes given have been grouped under five main heads; these again are subdivided, often into divisions numerically too minute for real statistical value.

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[1] U. S. Census *Report on the Blind and the Deaf*, p. 127.

Table XXVIII includes the main groups and those specific causes which number more than 3000 cases. The extreme variation in the percentages of those who are the offspring of consanguineous marriages cannot be attributed to mere chance. There is clearly some fundamental connection between consanguinity and congenital deafness if 11.8 per cent of all the congenitally deaf are the offspring of consanguineous marriages, while of the adventitiously deaf but 3.1 per cent are the offspring of such marriages. In fact we are tempted to jump at the conclusion that consanguinity is in itself a cause of deaf-mutism. Furthermore 42.1 per cent of the deaf whose parents were cousins were congeni-

TABLE XXVIII.

Cause of Deafness.	Total.	Consanguinity of Parents.			Per cent.		
		Cousins.	Not cousins.	Not stated.	Cousins.	Not cousins.	Not stated.
Total	89,287	4,065	75,530	9,692	4.5	84.6	10.9
Affections of external ear	871	29	760	82	3.3	87.3	9.4
Affections of middle ear	34,801	1,238	30,824	2,739	3.5	88.6	7.9
Affections of internal ear	12,295	343	11.121	831	2.8	90.4	6.8
Unclassified	31,205	2,183	25,281	3,741	7.0	81.0	12.0
Unknown	10,115	272	7,544	2,299	2.7	74.6	22.7
Scarlet fever	7,424	285	6,647	492	3.9	89.5	6.6
Disease of ear	4,210	222	3,683	305	5.3	87.5	7.2
Catarrh	11,702	304	10,450	948	2.6	89.3	8.1
Colds	3,074	81	2,666	327	2.6	86.7	10.7
Meningitis	3,991	83	3,741	167	2.1	93.7	4.2
Old age	3,361	38	2,369	954	1.1	70.5	28.4
Military service	3,242	40	2,897	305	1.2	89.4	9.4
Congenital	14,472	1,710	11,322	1,440	11.8	78.2	10.0

tally deaf, while this was true of but 15 per cent of those whose parents were unrelated.

But on the other hand, 53.4 per cent of the deaf whose parents were cousins had deaf relatives of the (a) and (b) groups, while of those whose parents were not cousins, only 29.9 per cent in these groups had deaf relatives. In Table XXIX the close connection between deaf relatives of these groups and consanguinity is shown. For the sake of simplicity no account is taken of (c) relatives (deaf children), and (d) relatives (deaf husbands or wives), for in the first case only 370 deaf are reported as having deaf children and at the same time no (a) or (b) relatives, and in the second case (d) relatives are not ordinarily blood relatives at all.

TABLE XXIX.

Class of Deaf Relatives.*	Total.	Consanguinity of Parents.			Per cent.		
		Cousins.	Not cousins.	Not stated.	Cousins.	Not cousins.	Not stated.
Total	89,287	4,065	75,530	9,692	4.6	84.6	10.6
Stated	80,481	3,911	73,639	2,931	4.9	91.5	3.6
Not stated	8,806	154	1,891	6,761	1.7	21.5	76.8
(a) relatives	21,660	1,850	18,838	972	8.5	87.0	4.5
No (a) relatives	58,821	2,061	54,801	1,959	3.5	93.2	3.3
(a) or (b) relatives	25,851	2,171	22,552	1,128	8.4	87.2	4.4
(a) and (b) relatives	4,117	412	3,587	118	10.0	87.1	2.9
(a) but no (b) relatives	17,543	1,438	15,251	854	8.2	86.9	4.2
(b) but no (a) relatives	4,191	321	3,714	156	7.7	88.6	3.7
No (a) or (b) relatives	54,630	1,740	51,087	1,803	3.2	93.5	3.3

*Symbols for deaf relatives: (a) deaf brothers, sisters and ancestors; (b) deaf uncles, aunts, cousins, etc.

Table XXIX shows unmistakably that the connection between consanguinity and hereditary deafness is very close. Where there is the largest amount of deafness in the family the percentage of consanguinity is the highest. That is, of those who had both (a) and (b) relatives ten per cent were the offspring of cousins, while of those who had neither (a) nor (b) relatives only three per cent were the offspring of cousins. It is natural to assume that as a rule where the deaf have either (a) or (b) deaf relatives, deafness is hereditary, for the probability of two cases of deafness occurring in the same family, uninfluenced by heredity would be very small. It is likely also that a great many of the deaf who stated that they had no deaf relatives were mistaken, for few people are well enough informed in regard to their ancestry to answer this question definitely. Not one man in thousands can even name all of his great-grandparents, to say nothing of describing their physical or mental traits. Others may have understood the inquiry to refer only to living relatives and therefore have omitted almost all reference to their ancestors. These possible errors might easily explain all the excess of the percentage of consanguinity among those reported as having no deaf relatives over the the probable percentage of consanguineous marriage in the general population. But this very probability that comparatively few deaf ancestors have been reported increases the probability that the greater part of the (a) relatives were brothers and sisters rather than ancestors. Now of the 26,221 deaf having deaf relatives, 17,345 have only (a) relatives, and if these are largely living brothers and sisters the relationship would "work both ways," so that if there were two deaf children in a family, each would have an (a) deaf relative. In the Census of Ireland figures above quoted it will be remembered that among families which were the offspring of cousins the proportion having two or

more deaf children was three times as great as among those who were not the offspring of consanguineous unions. If this follows in America it largely accounts for the high percentage of the congenitally deaf who are the offspring of cousin marriages, and especially of those who have (a) deaf relatives.

TABLE XXX.

Class of Deaf Relatives.*	Total.	Consanguinity of Parents.			Per cent.		
		Cousins.	Not cousins.	Not stated.	Cousins.	Not cousins.	Not stated.
Total	14,472	1,710	11,322	1,440	11.8	78.2	10.0
Stated	13,428	1,647	11,110	671	12.3	82.7	5.0
Not stated	1,044	63	212	769	6.0	20.3	76.7
(a) relatives	5,295	986	3,961	348	18.6	74.8	6.6
(b) and (c) but no (a) relatives.	860	126	686	48	14.6	79.8	5.6
No (a), (b) or (c) relatives	7,273	535	6,463	275	7.3	88.9	3.8

***Symbols for deaf relatives: (a) deaf brothers, sisters or ancestors; (b) deaf uncles, aunts, cousins, etc.; (c) deaf children.**

A further analysis of the congenitally deaf according to consanguinity of parents and deaf relatives, as in Table XXX, helps to determine to what extent the greater number of deaf children to a family among the offspring of consanguineous marriages has influenced the totals. From the report it cannot be determined how many of the congenitally deaf had (a), (b) or (c) relatives alone, but the existence of (b) and (c) relatives would almost certainly indicate that

the deafness was hereditary. Of these 14.6 per cent were the offspring of cousins, while of those having (a) relatives 18.6 per cent were the offspring of consanguineous unions. Thus it would seem to be a more reasonable conclusion that where two or more deaf-mutes appear in the same family, at least a tendency toward deaf-mutism is hereditary in the family and is intensified by the marriage of cousins, rather than that consanguineous marriage is in itself a cause. The fact that in many cases the relationship would " work both ways " would not greatly affect the percentage of the offspring of cousins having (b) and (c) relatives, for the chance would be slight that the (b) or (c) relative would be himself the offspring of a consanguineous marriage. Among the congenitally deaf who reported no deaf relatives the percentage of consanguineous parentage is still high, (7.3 per cent), but this excess can easily be accounted for by the ignorance of deaf relatives on the part of the informant, without contradicting the hypothesis of heredity.

Basing now our percentages on the totals of consanguineous and non-consanguineous parentage respectively, and including only those who answered the inquiry as to deaf relatives, it will be seen (Table XXXI) that while of all the deaf less than one third are returned as having deaf relatives, of the deaf who were the offspring of cousins over one half (55.5 per cent) were returned as having (a) or (b) deaf relatives.

Again taking into consideration only the congenitally deaf the results are still more striking. Table XXXII shows that 66.5 per cent of the congenitally deaf who are of consanguineous parentage are known to have deaf relatives.

TABLE XXXI.

Class of Deaf Relatives.	Total.	Consanguinity of Parents.		Per cent.		
		Cousins.	Not cousins.	Total.	Cousins.	Not cousins.
Deaf relatives stated	80,481	3,911	73,639	100.0	100.0	100.0
(a) relatives	21,660	1,850	18,838	26.9	47.3	25.5
No (a) relatives	58,821	2,061	54,801	73.1	52.7	74.5
(a) or (b) relatives	25,851	2,171	22,552	32.1	55.5	30.6
(a) and (b) relatives	4,117	412	3,587	5.1	10.5	4.8
(a) and no (b) relatives	17,543	1,438	15,251	21.8	36.8	20.7
(b) and no (a) relatives	4,191	321	3,714	5.2	8.2	5.1
No (a) or (b) relatives	54,630	1,740	51,087	67.9	44.5	69.4

Symbols for deaf relatives: (a) deaf brothers, sisters or ancestors; (b) deaf uncles, aunts, cousins, etc.; (c) deaf children; (d) deaf husbands or wives.

TABLE XXXII.

Class of Deaf Relatives.	Total.	Consanguinity of Parents.		Per cent.		
		Cousins.	Not cousins.	Total.	Cousins.	Not cousins.
Deaf relatives stated	13,428	1,647	11,110	100.0	100.0	100.0
(a) relatives	5,295	986	3,961	39.5	59.9	35.6
(b) or (c), no (a) relatives	860	126	686	6.4	7.6	6.2
No (a), (b) or (c) relatives	7,273	535	6,463	54.2	32.5	58.2

Symbols for deaf relatives: (a) deaf brothers, sisters or ancestors; (b) deaf uncles, aunts, cousins, etc.; (c) deaf children.

The percentage having (a) relatives, including brothers and sisters, is nearly twice as great among the deaf of consanguineous parentage as among the offspring of unrelated parents. This is not inconsistent with the Irish returns which show the average number of deaf children to a family to be so much greater where the parents were cousins, than where they were not.

The statistics of the (c) relatives, or deaf sons and daughters of the deaf, are not very full. Of the 31,334 married deaf who answered the inquiry in regard to deaf relatives, 437 or 1.4 per cent reported deaf children and 30,897 or 98.6 per cent reported no deaf children. Of the totally deaf 2.4 per cent had deaf children, and of the congenitally deaf 5.0 per cent. The percentage of deaf children varied greatly according to the number and class of deaf relatives, as shown by Table XXXIII.

TABLE XXXIII.

Class of Deaf Relatives.	Percentage having deaf children.			
	Total.	Totally deaf.	Partially deaf.	Congenitally deaf.
(a), (b) or (d)	1.4	2.4	1.1	5.0
(d)	3.2	3.3	2.6	6.4
No (d)	1.1	1.4	1.0	2.5
(a) and (d)	6.3	6.7	4.3	7.8
(d), but no (a)	2.2	2.2	2.0	4.9
(a), but no (d)	1.4	2.3	1.3	2.6
No (a) or (d)	0.9	1.0	0.9	2.3
(a), (b) and (d)	9.5	9.9	*	9.0
(a), (d), but no (b)	5.5	5.9	3.6	7.4
(b), (d), but no (a)	2.5	2.4	*	*
(d), but no (a) or (b)	2.2	2.2	2.0	5.2
(a), (b), but no (d)	1.9	3.1	1.7	*
(a), but no (b) or (d)	1 3	2.1	1.2	2.8
(b), but no (a) or (d)	1.0	1.6	1.0	*
No (a), (b) or (d)	0.9	1.0	0.9	2.6

* Percentages not given where base is less than 100.

Symbols: (a) deaf brothers, sisters or ancestors; (b) deaf uncles, aunts, cousins, etc.; (d) deaf husbands or wives.

The striking feature of these percentages is the regularity with which they increase in proportion as the number of deaf relatives increases, until among the 242 persons who have (a), (b) and (d) relatives, 23 or 9.5 per cent also have (c) relatives. A consanguineous marriage within a family tainted with deafness would have the same effect as doubling the number of deaf relatives, which as we have seen greatly increases the percentage having deaf children.

It would seem that the number of the married deaf reported as having deaf children is much too small, especially since Dr. Fay[1] produces statistics of 4471 marriages of the deaf of which 300 produced deaf offspring. Counting only the 3,078 marriages of which information in regard to offspring was available these figures show an average of a little less than one such marriage in ten as productive of deaf offspring. The total number of children of these marriages was 6,782, of which 588 were deaf. These 3,078 marriages represented 5,199 deaf married persons as compared with the 31,334 reported in the Twelfth Census, or about one sixth. Increasing the 300 families who had deaf children in the same ratio we have 1800 as compared with the 437 reported by the census. But as it was inevitable that Dr. Fay's cases should be selected somewhat, he has probably collected records of more than one sixth of all the cases where deaf children were born of deaf parents. But we can hardly believe that he found three-fourths of such cases. The true number therefore must be considerably greater than 437, but less than 1800.[2]

Dr. Fay found that 31 out of the 4,471 marriages of the deaf were consanguineous, but he expresses the belief that the

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[1] *Marriages of the Deaf in America*, chap. v.

[2] Of the 17 children of first cousins reported on my circulars as either totally or partially deaf, 9 are known to have had deaf ancestors.

[illegible]

[illegible]

[illegible]

actual number and percentage of consanguineous marriages of the deaf are larger. The following table which combines several of Dr. Fay's tables sets forth the main results of his work. In each instance one or both parties to the marriage were deaf. The totals include only those of whom information as to the offspring was available.

TABLE XXXIV.

Consanguineous Marriages of the Deaf.	Number of marriages.	Marriages resulting in deaf offspring.		Deaf children.		
		Number.	Per cent.	Number	Number deaf.	Per cent deaf.
First cousins	7	4	57.	26	7	27.
Second cousins	5	3	60.	25	10	40.
Third cousins	1	1	—	1	1	—
"Cousins"	14	3	21.	36	7	19.
Nephew and aunt	1	1	—	4	3	75.
Distantly related	3	2	67.	8	2	25.
Total consanguineous	31	14	45.	100	30	30.
Not consanguineous, or no information	3,047	286	9.	6,682	558	8.
Grand total	3,078	300	10.	6,782	588	9.

Obviously percentages based on these figures are of little value of themselves, especially since Dr. Fay's cases are not entirely typical, but in general this table points us to the same conclusion that we have reached by other means,

namely that where a tendency toward deafness exists, a consanguineous marriage is more likely to produce deaf children than a non-consanguineous marriage. If more figures were available the percentage of deaf children would probably increase with the nearness of consanguinity and the number of deaf relatives, but with the present data a further analysis has no significance.[1]

If, then, consanguineous marriages where relatives are deaf have a greater probability of producing deaf offspring, and also a greater probability of producing plural deaf offspring, than ordinary marriages, and two thirds of the congenitally deaf offspring of consanguineous marriages do have deaf relatives, it does not seem necessary to look beyond the law of heredity for an explanation of the high percentage of the congenitally deaf who are of consanguineous parentage.

In those cases of deafness which, in the Census returns, are ascribed to specific causes, the factor of consanguinity is still noticeable, although the percentage of the non-congenitally deaf who are the offspring of cousins never exceeds 5.3 (Table XXVIII). But the influence of heredity is not removed by the elimination of the congenitally deaf. Many instances are known where successive generations in the same family have developed deafness in adult life, often at about the same age and from no apparent cause. The following case well illustrates this point. It is furnished me by a correspondent in whom I have great confidence. The facts are these: A—— aged

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[1] Mr. Edgar Schuster (*Biometrika*, vol. iv, p. 465) finds from Dr. Fay's statistics that the average parental correlation (parent and child) of deafness is: paternal, .54; maternal, .535. English statistics of deafness give: paternal correlation, .515; maternal, .535. The fraternal correlation from the American data is .74 and from the English .70. See *infra*, p. 92.

[illegible]

[illegible]

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28 married B—— aged 19, his first cousin who bore the same surname as himself. Both lived to old age and were the parents of eight children, two of whom died in infancy. My informant further states:

> Having personally known very well all of the surviving six children of this family, I can truthfully state that all were unusually strong, active and vigorous people and all the parents of healthy children. A——— was troubled with deafness as long as I can remember, and this physical trait he transmitted to all of his children, though some of them did not develop the same till well along in life. C——— (the youngest son), however, began to indicate deafness quite early. No one of his four children is in the least deaf.

It will be noticed here that whereas in the case of the cousin marriage the trait was so strongly inherited, it disappeared entirely in the next generation with a non-consanguineous marriage. The inheritance of tendencies or weaknesses may be more common than the actual inheritance of defects. Dr. Bell's words on this point are suggestive:

> Where a tendency toward ear trouble exists in a family, it may lie dormant and unsuspected until some serious illness attacks some member of the family, when the weak spot is revealed and deafness is produced. We are not all built like that wonderful one-horse shay that was so perfectly made in all its parts that when at last it broke down it crumbled into dust. When an accident occurs it is the weak spot that gives way, and it would be incorrect to attribute the damage to the accident alone and ignore the weakness of the part; both undoubtedly are contributing causes.

In the case, then, of a deaf person who has deaf relatives, the assigned cause of deafness may not be the only cause involved, or indeed the true cause at all. It may be the cause

simply in the same sense that the pulling of a trigger is the cause of the expulsion of a bullet from a rifle, or a spark the cause of the explosion of a gunpowder magazine; hereditary influences may be involved.[1]

It is thus possible to account for the large proportion of deafness among persons of consanguineous parentage by the simple action of the laws of heredity. Why then should we go out of our way to look for a cause of the defect in consanguinity itself? When two explanations are possible, the simpler explanation is the more probable, other factors being equal; but in the present problem the factors are not equal, for the evidence points strongly toward the simpler hypothesis of intensified heredity, while there is little or no evidence that consanguinity is a cause *per se*.

As to the probability then of a consanguineous marriage producing deaf offspring, it will readily be seen to be very slight, and in those cases where there is actually no trace of hereditary deafness in the family, perhaps no greater than in non-related marriages. While the census figures in regard to the deaf are not complete they probably include a great majority of the deaf in the United States. The 89,287 deaf would mean an average of 12 deaf persons to every 10,000 inhabitants and the 14,472 congenitally deaf, 2 persons to every 10,000. Assuming then, as before[2] that 1,000,000 persons in continental United States are the offspring of consanguineous marriages within the limits of the term "cousins" as used in the Census report, 41 out of every 10,000 persons of consanguineous parentage would be deaf, and 17 congenitally so. Thus less than one half of one per cent of the offspring of consanguineous mar-

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[1] U. S. Census *Report on the Blind and the Deaf*, p. 127.

[2] *Supra*, p. 64.

riages in the United States are deaf, and only one sixth of one per cent are deaf-mutes in the commonly accepted sense of the term.

It is interesting here to quote an opinion given by Dr. Bell in 1891, as to the probable results of the consanguineous marriage of deaf persons.[1]

> 1. A deaf person, not born deaf, who has no deaf relatives, will probably not increase his liability to have deaf offspring by marrying a blood relative.
>
> 2. A deaf person, born deaf, who has no deaf relatives, will probably increase his liability to have deaf offspring by marrying a blood relative.
>
> 3. A deaf person, whether born deaf or not, who has deaf relatives, will probably increase his liability to have deaf offspring by marrying a blood relative, especially if that relative should happen to be on the deaf side of the family. For example: If his father has deaf relatives and his mother has none, he will be more likely to have deaf offspring if he marries a relative of his father than if he marries a relative of his mother.
>
> The laws of heredity seem to indicate that a consanguineous marriage increases or intensifies in the offspring whatever peculiarities exist in the family. If a family is characterized by the large proportion of persons who enjoy good health and live to old age with unimpaired faculties, then a consanguineous marriage in such a family would probably be beneficial, by increasing and intensifying these desirable characteristics in the offspring. On the other hand, if a large proportion of the members of a family betray weakness of constitution—for example: if many of the children die in infancy, and a large proportion of the others suffer from ill health, only a few living to old age with unimpaired faculties—then a consanguineous marriage in such a family would probably be hurt-

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[1] *Marriage—An Address to the Deaf*, second edition, Appendix.

ful to the offspring. A large proportion of the children would probably die in infancy, and the survivors be subject to some form of constitutional weakness.

As there are few families entirely free from constitutional defects of some kind, a prudent person would do well to avoid a consanguineous marriage in any case — not necessarily on account of deafness, but on account of the danger of weakening the constitution of the offspring. Remoteness of blood is eminently favorable to the production of vigorous offspring, and those deaf persons who have many deaf relatives would greatly diminish their liability to have deaf offspring by marrying persons very remote in blood from themselves.

Children, I think, tend to revert to the type of the common ancestors of their parents. If the nearest common ancestors are very far back in the line of ancestry, the children tend to revert to the common type of the race. Deafness and other defects would be most likely to disappear from a family by marriage with a person of different nationality. English, Irish, Scotch, German, Scandinavian and Russian blood seems to mingle beneficially with the Anglo-Saxon American, apparently producing increased vigor in the offspring.

CHAPTER VII

Summary and Conclusion

Having thus considered the more important problems which have been connected with the marriage of near kin, we have only to discuss the bearing of the conclusions thus formed upon the social aggregate, and the effect which consanguineous marriages have upon the evolution and improvement of the human species.

It has been shown that the frequency with which consanguineous marriages occur varies greatly with the physical and social environments; that such marriages are more frequent in isolated and in rural communities than in cities; and that with the increasing range of individual activity and acquaintance the relative frequency of consanguineous marriage is decreasing.

Consanguinity in the parents has no perceptible influence upon the number of children or upon their masculinity, and has little, if any, direct effect upon the physical or mental condition of the offspring.

The most important physiological effect of consanguineous marriage is to intensify any or all inheritable family characteristics or peculiarities by double inheritance. The degree of intensification probably varies with the nature of the characteristic; degenerate conditions of the mind, and of the delicate organs of special sense being the most strongly intensified.

It is probable also that in the absence of degenerative

tendencies the higher qualities of mind and body are similarly intensified by marriage between highly endowed members of the same family. Dr. Reibmayr believes that inbreeding is necessary to the higher evolution of the race: "A settled abode, natural protection from race mixture and the development of a closely inbred social class are the basic conditions of every culture period." But inbreeding must not be carried too far: "In the course of generations the ruling class begins to degenerate mentally and physically, until not only is the class destroyed, but for lack of capable leadership the people (Volk) itself is subjugated and a crossing of blood again takes place." [1]

In the breeding of animals the closest inbreeding is frequently resorted to in order to improve the stock, and many examples can be given of the closest possible inbreeding for generations without apparent detriment, but it is universally admitted that the animals selected for such inbreeding must be sound constitutionally, and free from disease. After a certain number of generations however, degeneration apparently sets in. The number of generations through which inbreeding may be carried varies with the species, and the purpose for which the animals are bred. Where they are bred primarily for their flesh, as for beef, mutton or pork, it can be pursued farther and closer than where they are bred for achievement in which a special strength is required —for instance in the breeding of race horses. This would indicate that the more delicate brain and nervous system is sooner affected than the lower bodily functions.

In man, however, freedom from hereditary taint cannot so easily be secured. Individuals cannot be selected scientifically for breeding purposes. Furthermore, the human body is more delicately constructed than that of the lower

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[1] Trans. from *Inzucht und Vermischung beim Menschen*, p. 46.

animals, and the nervous system is more highly developed and specialized, so that it is reasonable to suppose that in man degeneration would set in earlier in the process of inbreeding, and that it would be impossible to breed as closely as with the lower animals. Instances are well known, however, where incestuous unions have been productive of healthy offspring, and successive generations of offspring of incestuous connection are not unknown; but, although statistics are lacking, it seems to be very often true that children of such unions are degenerate. It may be that the reason for this is that with the laws and social sentiments now prevailing in all civilized communities, only degenerates ever contract incestuous alliances. Desirable as it may be from a social point of view that this strong sentiment against incest should continue, it is not yet *proven* that even the closest blood relationship between the parents is directly injurious to the offspring. The "instinctive horror of incest" is a myth, for although a horror of incest does very properly exist in civilized, and in some tribal societies, it is purely a matter of custom and education, and not at all a universal law.

Double heredity may account for all the observed ill effects of consanguineous marriage, including the high youthful death-rate, the higher percentage of idiocy, deafness and blindness, and probably also the scrofulous and other degenerate tendencies; nevertheless, there may be in some instances a lowering of vitality which this hypothesis does not fully explain.

The tendency of inbreeding in animals, it is well known, is to fix the type, the tendency of crossing, to variation. Inbreeding then, tends to become simple repetition with no natural variations in any direction, a stagnation which in itself would indicate a comparatively low vitality. Variation and consequent selection is necessary to progress.

"Sex," according to Ward[1] "is a device for keeping up a difference of potential," and its object is not primarily reproduction, but variation.[2]

> It is organic differentiation, higher life, progress, evolution. . . . But difference of potential is a social as well as a physiological and physical principle, and perhaps we shall find the easiest transition from the physiological to the social in viewing the deteriorating effects of close inbreeding from the standpoint of the environment instead of from that of the organism. A long-continued uniform environment is more deteriorating than similarity of blood. Persons who remain for their whole lives, and their descendants after them, in the same spot, surrounded by precisely the same conditions, and intermarry with others doing the same, and who continue this for a series of generations, deteriorate mentally at least, and probably also physically, although there may not be any mixing of blood. Their whole lives, physical, mental, and moral, become fixed and monotonous, and the partners chosen for continuing the race have nothing new to add to each other's stock. There is no variation of the social monotony, and the result is socially the same as close consanguineal interbreeding. On the other hand, a case in which a man should, without knowing it, marry his own sister, after they had been long separated and living under widely different skies, would probably entail no special deterioration, and their different conditions of life would have produced practically the same effect as if they were not related.[3]

Professor Ward's idea of "difference of potential," or contrast, as essential to the highest vigor of the race as well as to

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[1] *Pure Sociology*, p. 232.

[2] Pearson (*Grammar of Science*, p. 373) points out that variation does occur in asexual reproduction. But that sex is at least a powerful stimulus to variation can hardly be questioned.

[3] Ward, *op. cit.*, pp. 234-235.

that of the individual offspring, offers an alternative explanation of the observed results of consanguineous marriages, and one which does not necessarily conflict with the explanation already given. All the phenomena of intensification are simply due to a resemblance between husband and wife in particular characteristics, such as a common tendency toward deafness or toward mental weakness. This resemblance, which may or may not be the result of a common descent, renders more probable the appearance of the trait in the offspring. If the parents closely resembled each other in many respects they would be more likely to " breed true " and the children would resemble one another in their inherited traits, thus accounting for the high average of deaf-mutes to the family, observed in the Irish statistics.[1]

The theory of contrast and resemblance supplements that of intensified heredity where the resemblance is general, rather than in particular traits or characteristics. In such a case the absence of the stimulating effects of contrast might result in a lowering of vitality, which in turn would react upon the youthful death-rate.

Where then related persons differ greatly in mental and physical traits, and generally speaking, belong to different types, it is very improbable that there would be any ill effects resulting from the mere fact of consanguinity. A case in point is furnished me by a correspondent. A first cousin marriage which turned out exceedingly well was between strongly contrasted individuals; the husband was " short, stocky and dark complexioned " while the wife was " tall, slight of figure, and of exceedingly light complexion." In other cases in which the results were not so good the husband and wife bore a close resemblance to one another, physically and mentally.

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[1] *Cf. supra*, p. 66.

This, however, does not agree with the results obtained by Professor Karl Pearson. Basing his conclusions on the correlation of stature between husband and wife, he believes that homogamy is a factor of fertility. Taking 205 marriages from Mr. Francis Galton's *Family Records*, Professor Pearson found the correlation between husband and wife to be .0931 ± .0467, while weighted by their fertility the correlation was .1783 ± .0210, practically doubling the intensity of assortative mating.[1] The value of these correlations, however, is impaired, as he says, by the insufficient number of observations, and by the fact that absolutely taller mothers are the more fertile.

In a subsequent investigation of from 1000 to 1050 pairs of parents of adult children, Professor Pearson found the correlation in stature to be .2804 ± .0189; of span .1989 ± .0204; and of forearm .1977 ± .0205; with cross coefficients varying from .1403 to .2023. If, as he believes, "The parents of adult children are on the average more alike than first cousins, then it follows that any evils which may flow from first cousin marriage depend not on likeness of characters, but on sameness of stock." [2]

But even if it were true, as is very improbable, that parents of adult children are more alike than first cousins, it would still be likely to follow that first cousins who married would be more alike than first cousins in general. A certain degree of resemblance is undoubtedly necessary to complete fertility: husband and wife must be physically compatible, and must both enjoy a certain degree of health and physical strength. These facts are admitted by all, but it does not follow that resemblance beyond a certain point is not in itself detrimental.

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[1] *Royal Society Proceedings*, vol. 66, p. 30.

[2] *Biometrika*, vol. ii, p. 373.

Professor Pearson's own experiments in this line, however, do not give consistent results, for in correlating eye-color with fertility, heterogamy seems to increase fertility. The highest average fertility (4.57) is in those cases where the father is dark-eyed and the mother light-eyed, while the lowest is where both parents have blue-green or gray eyes.[1]

In a recent study an attempt has been made to measure the coefficient of correlation between cousins.[2] In the characteristics of health, success, temper and intelligence the coefficients ranged between .25 and .30. These values differ but little from those found to obtain for the resemblance between avuncular relatives for eye color (.265), or between grandparent and grandchild for the same characteristic (.3164).[3] Positive results were also found, with one doubtful exception, for the occurrence of insanity and tuberculosis in cousins. The writer concludes: "The grandparent, the uncle and aunt, and the cousin are on practically the same footing with regard to relationship or intensity of kinship as measured by degree of likeness of character; and it seems probable that any scientific marriage enactments would equally allow or equally forbid marriage between grandparent and grandchild, uncle and niece, aunt and nephew, and between first cousins." [4]

As we should expect the resemblance between near relatives has been found to be much greater. From a measurement of from 4000 to 4886 pairs, the average correlation of the characteristics of stature, span, forearm length and

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[1] *Phil. Trans. of the Royal Society*, vol. 195 A, p. 150.

[2] Elderton and Pearson, "On the Measure of the Resemblance of First Cousins." *Eugenics Laboratory Memoirs IV*. Reviewed in *Br. Med. Journal*, Feb. 15, 1908.

[3] *Phil. Trans. of the Royal Society*, vol. 195 A, p. 106.

[4] Elderton and Pearson, *op. cit.*

eyecolor between parent and child was .4695. By similar computations and measuring the same characteristics, the fraternal correlation was found to be .508.[1] From measurements of a greater variety of characteristics in school children the mean fraternal correlation was .539.[2] In athletic power the coefficient was still higher, .72 between brothers, .75 between sisters and .49 between brothers and sisters. Measurements of mental characteristics—vivacity, assertiveness, introspection, popularity, conscientiousness, temper, ability and handwriting proved to be as easily correlated, the mean coefficients being; brothers, .52, sisters .51, brothers and sisters .52.[3]

The relative amount of degeneracy and disease among the offspring of consanguineous marriages has been enormously exaggerated, and the danger is by no means as great as is popularly supposed. Nevertheless, since it is undoubtedly true that on the average such marriages do not produce quite as healthy offspring as do non-consanguineous unions, and since public sentiment is already opposed to the marriage of cousins, it is perhaps just as well that existing laws on the subject should remain in force. From the standpoint of eugenics however, it is much more important that the marriage of persons affected with hereditary disease should be prevented. Dr. Bell has pointed out the danger of producing a deaf-mute race by the intermarriage of congenitally deaf persons,[4] and this warning

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[1] Pearson and Lee, "On the Laws of Inheritance in Man," *Biometrika*, vol. ii, p. 387.

[2] *Ibid.*, p. 388.

[3] Pearson, "On the Laws of Inheritance in Man," part 2, *Biometrika*, vol. iii, p. 154.

[4] "Memoir upon the Formation of a Deaf Variety of the Human Race." *Memoirs of the National Academy of Sciences*, vol. ii, pp. 177-262.

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should be made to apply to other congenital defects as well. Some states already prohibit the marriage of the mentally defective, and persons under the influence of intoxicants. Such provisions are wise, and are the most practical means of achieving eugenic ideals—by preventing the propagation of the unfit. The interests of society demand that the mentally and physically defective should not propagate their kind.

From the broader viewpoint of social evolution the problems of inbreeding or crossing of stocks merge into the discussion of the endogamous and exogamous types of society. Whatever may have been the origin of exogamy, the survival of the exogamous type in progressive societies may easily be explained on the ground of superior adaptability, variability and plasticity, which enables such societies to survive a change of environment while the more rigid structure of the endogamous clan brings about its extermination.

Inbreeding leads to caste formation and a rigid and stratified social structure, which is in the end self-destructive, and cannot survive a change of environment. The governing caste may, as Reibmayr says, favor the growth of culture, but it is usually the culture of that caste, and not of the people at large. The ruling caste is usually the result of selection of the strongest and ablest, but after it becomes a caste, the individuals are selected on account of hereditary social position and not primarily on account of ability. Now biological experiments show that although artificial selection may be carried to a point where animals will breed true to a characteristic to within 90 per cent, yet if selection is stopped, and the descendants of the selected individuals are allowed to breed freely among themselves, they will in a very few generations revert to the original type. This is what happens in a social caste, unless, as in the case of the English

aristocracy, it is continually renewed by selection of the ablest of the other classes.

The superposition and crossing of cultures, the development of secondary civilization, is necessary to social evolution in its broadest sense, and this usually involves crossing of blood as well as crossing of cultures. As a result of the unprecedented migrations of the last half-century we have in the United States the greatest variety of social types ever brought so closely together. An opportunity is offered either for the perpetuation of each racial type by inbreeding, with the prospect of an indefinite stratification of society, or for the amalgamation of all cultural and racial elements into a homogeneous whole, and the development of a race more versatile and adaptable than any the world has yet known. The general tendency will undoubtedly be toward amalgamation, but there are decided tendencies in the other direction, as for instance in the "first families of Virginia," and in that large element of the New England population which prides itself upon its exclusively Puritan ancestry, and which has inherited from its progenitors that intolerance which characterized the early settlers of New England more than the pioneers of the other colonies. The dynamic forces of modern civilization are, however, opposed to caste—the West has long ago obliterated the distinction between the Pennsylvania German and the Puritan, the Scotch-Irish and the Knickerbocker Dutch. These same dynamic forces, which have prevented the formation of caste have at the same time been diminishing the percentage of consanguineous marriage and will undoubtedly continue to operate in the same way for some time to come. And when rational laws prohibit the marriage of the diseased and the degenerate, the problem of consanguineous marriage will cease to be of vital importance.

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ADOLPHE QUETELET AS STATISTICIAN

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ADOLPHE QUETELET

AS

STATISTICIAN

BY

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PREFATORY NOTE

It is not presumed that the dissertation here presented will add much to the knowledge of Quetelet possessed by those who have read rather extensively in statistical literature. But it is hoped that the increasing number of those who are becoming interested in Quetelet and his work may find these pages useful. The first two chapters give brief sketches of the man, his work and his place in the history of statistics. The last three chapters present what are believed to be the most important of Quetelet's statistical principles. These include the conception of the Average Man as a type, the significance for social science of the regularities found in the moral actions of man, and the theoretical basis of the distribution of group phenomena about their type.

Grateful acknowledgment should here be made to Professor Henry L. Moore for directing me to this stimulating subject, and for continued helpfulness in its pursuit.

CONTENTS

CHAPTER I

Biographical Sketch

PAGE

Parentage—Youthful literary activity—At the University of Ghent; the influence of Garnier—Called to the Athenaeum at Brussels—Contributions to mathematics—Educational activity at Brussels; his elementary treatises and characteristics as a teacher—Founding of the Brussels Observatory; sojourn in Paris—Travels in Germany, Italy and Sicily—Research work at the Observatory—Studies in meteorology and terrestrial physics—His activity in connection with *l'Académie royale de Belgique*—Activity as an official statistician—Founding of the *Commission centrale de statistique*, of the Statistical Society of London and of the International Statistical Congress—Stroke of apoplexy in 1855—Member of many learned societies—His personality—Home life—The Brussels statue 9

CHAPTER II

Quetelet in the History of Statistics

Two lines of development in statistical literature—One of these, the German University "*Statistik*," traced through the writings of Muenster, Conring, Achenwall, Von Schlözer and Büsching—The growth of official statistics and the gradual modification of the university discipline—Quetelet's contribution to this change—A second line of statistical development traced through the works of Graunt, Petty and others of the School of Political Arithmetic, Derham, Süssmilch, and the first formulators of mortality tables—The influence of Malthus, Laplace, and especially of J. B. Fourier—Quetelet's contribution to this line of development, treated under (I) population statistics, (II) moral statistics; (III) technique and (IV) application of the normal law of error to the physical measurements of men—Summary 36

CHAPTER III

The Average Man

Importance of this concept in Quetelet's writings—Survey of its development—Its generalization in *Du Système social*—Studies to determine the qualities of the average man—Rôle of the average man in various sciences—Objections: the average man cannot be constructed as a composite being—The average as the type of

PAGE
perfection—Distinction of results obtained in some of Quetelet's studies—The average man as a biological type—The permanence of the type—Quetelet's approach to the doctrine of selection by environment 62

CHAPTER IV

MORAL STATISTICS

Introductory—Definition—Quetelet's principal works on moral statistics and his emphasis upon statistical regularities—His explanation of these regularities—The viewpoint of science and its bearing upon the doctrine of free will and upon the explanation of statistical regularities—Explanation of the fluctuations in the numbers from year to year—And of the variations about an average—Because of the way in which they are formed, the regularities exert no compulsion over the individual—Significance of the regularities for the doctrine of free will—Bearing of statistical inquiry on this doctrine—The statistical regularities and social laws—The difficulty of establishing quantitative relations between social events and their conditions—The effect of the dynamic character of social life upon statistical regularities and their laws—Two basic principles of method in moral statistics—And their importance for the quantitative study of social phenomena 83

CHAPTER V

STATISTICAL METHOD

The basis of statistical method found in the variability of organic and social phenomena about type forms—The probability of an event when all its chances are known—Inductions from experience when the number of chances is unknown—The distribution of chances when their number is small—Agreement between theory and experience tested—The distribution of chances when their number is very large—Quetelet's scale of possibility and precision—The derivation of this scale explained—The curve representing the distribution of chances when their number reaches the conceptual limit—Theory provides for extremely improbable combinations, but such are not met with in experience—Quetelet's distinction of "means properly so called" from "arithmetic means"—The theory of the distribution of chances related to the theory of the distribution of errors of measurement and to the distribution of biological measurements—Description of the application of Quetelet's scale to a statistical problem—The probable error—The normal curve only one of many possible forms—The significance of narrowing limits of deviation—Quetelet's classification of causes—Constant causes not revealed by statistical inquiry—Variable causes—Kinds of accidental causes—Causes classified as general and minute—Causes studied by correlation . . . 106

CHAPTER I

BIOGRAPHICAL SKETCH

It might be set down as a rule of mental conduct that, when we become interested in the achievements of a great man, we desire a more intimate acquaintance with his personality and with the routine of his daily life. The deeds of statesmen and warriors are readily appreciated by the generality of men. This is due, not only to their conspicuousness and to the glamour and fascination attending those who achieve notable success in the world of affairs, but to the immediate responsiveness of human emotions to the heroic. But not infrequently does it happen that many years are required for the most important contributions to knowledge to become the possession of an extended and appreciative group of initiated disciples. Herein is found the reason for this brief sketch of Adolphe Quetelet.[1] Not that his scientific achievements have been passed by with little or no comment, but that there is to-day a rapidly widening group

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[1] Quetelet's name is sometimes accented—Quételet. There is, however, abundant reason for omitting the accent. In the *Nouveau Mémoires*, the *Bulletins* and the *Annuaire* of the Brussels Academy, in the *Annales* and the *Annuaire* of the Brussels Observatory, and in a number of his works brought out at Brussels, the name is uniformly unaccented. When it is recalled that Quetelet was Secretary of the Academy for forty years and Director of the Observatory for even a longer term, it seems certain that he himself did not accent his name. Moreover in places where he has signed his name it is not accented. The accented spellings seem to be due to Paris publishers.

CHAPTER I

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of scholars who appreciate the distinctive merit of his development of statistical methods of research. It is believed that such will be interested in a brief account of the man himself.[1]

Born on the twenty-second of February, 1796, in the ancient and historic town of Ghent, Quetelet grew up there amid the stirring scenes which marked the fall of the old régime and the rise of the empire of the brilliant and ambitious Napoleon. Little is known of his parents. No mention is anywhere made of his mother except that her maiden name was Anne-Françoise Vandevelde. His father, François-Augustin-Jacques-Henri Quetelet, is known to have been born at Ham, in Picardy, in 1756. Being of a somewhat adventurous spirit, François crossed the English Channel at an early age and is said to have become an English citizen. He soon became secretary to a Scotch nobleman, with whom he spent several years traveling on the Continent and sojourning in Italy. He then settled permanently at Ghent, about 1787. Here he was at length elevated to the position of a municipal officer, in which capacity he rendered valuable and well-

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[1] The chief source for this sketch is the "Essai sur la vie et les ouvrages de Quetelet," by Edward Mailly, one of Quetelet's students and his assistant for thirty-seven years, in the *Annuaire de l'académie royale des sciences, des lettres et des beaux-arts de Belgique* (Brussels, 1875), vol. xli, pp. 109–297. In addition should be mentioned the following: (1) Naúm Reichesberg, "Der berühmte Statistiker, Adolphe Quetelet, sein Leben und sein Wirken," *Zeitschrift für schweizerische Statistik* (Berne, 1893), Jahrg. xxxii, pp. 418–460; (2) the "Discours" pronounced at Quetelet's funeral, *Bulletins de l'académie royale des sciences, des lettres et des beaux-arts de Belgique* (Brussels, 1874), Second Series, vol. xxxvii, pp. 244-266; (3) Mailly, "Notice sur Adolphe Quetelet," *ibid.*, vol. xxxviii, pp. 816–844; (4) Wolowski, "Éloge de Quetelet," *Journal de la société de statistique de Paris* (1874), vol. xv, pp. 118–126. Other less important references will be found in the notes.

esteemed services. He died in 1803, when Adolphe was but a boy of seven.

It was thus that, upon his graduation from the Lyceum at Ghent, young Quetelet was compelled, at the age of seventeen, to turn his talents to good account. He spent the next year as teacher of mathematics in a private school at Audenaerde.[1] On his nineteenth birthday he was chosen instructor in mathematics at the newly organized college in his native city.

The time between his election and the opening of the University in October, 1817, seems to have been spent largely in literary composition. In collaboration with G. Dandelin, a former student at the Lyceum, he prepared the libretto for an opera "en un acte, en prose et à grand spectacle," entitled *Jean Second ou Charles Quint dans les murs de Gand.* This was successfully presented at Ghent, and led to the partial construction of two more dramas by the same authors. Quetelet published quite a number of poems,[2] and until the age of thirty he continued to exercise his poetical talents as pastime and relief from his scientific studies. His poems were of a serious tone, but were well received by both public and critics. We may mention here an *Essai sur la romance,* which Quetelet brought out in 1823. In this, from a survey of romance among different peoples, he found the origin of romance in the days of chivalry. This essay, together with translations, in prose and in verse, of German, English, Italian and Spanish romances, shows Quetelet's wide acquaintance at that early age with the

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[1] One of his students here was M. Liedts, who afterwards, as minister of the interior, authorized the *Commission centrale de la statistique.*

[2] Chiefly in the *Annales belgiques* and *Études et leçons françaises de littérature et de morale.* Mailly, *Essai,* pp. 114–131, quotes at length from these poems.

various European literatures. Mailly, who must be viewed as a friendly critic, believes the *Essai sur la romance* and many of the poems deserving of republication.

During the three years of his service at the College of Ghent the most important influence brought to bear upon him was that of Jean Guillaume Garnier,[1] professor of astronomy and higher mathematics. This expert mathematician and refined scholar was called from Paris to the University of Ghent by the King of the Low Countries in 1817. His influence over Quetelet's eager, youthful spirit was quite decisive. Quetelet says of him,

> Little by little his conversation, always instructive and animated, gave a special direction to my tastes, which would have led me by preference towards letters. I resolved to complete my scientific studies and followed the courses in advanced mathematics given by M. Garnier. It was at the same time agreed by us that, in order to relieve him in his work, I should give some of the other courses with which he was charged. I thus found myself his pupil and his colleague.[2]

The aspiring dramatist soon found a favorite occupation in the reading of Pascal.

Quetelet was the first to receive the degree of doctor of science from the new university. His dissertation was an original contribution of much importance to the

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[1] 1766–1840. He was examiner at l'École polytechnique, 1795–1800; adjunct professor with Lagrange at the same place, 1800–1802; one of Poisson's instructors and an intimate of J. B. Fourier. See *Nouvelle biographie générale* (Paris, 1858), vol. xix, also "Notice sur J. G. Garnier," by Quetelet, in the *Annuaire de l'académie royale de Bruxelles* (1841), vol. 7; and sketch by Quetelet in *Sciences mathématiques et physiques au commencement du xix^e siècle* (Brussels, 1867).

[2] "Notice sur J. G. Garnier," *Annuaire de l'acad. roy. de Brux.* (1841), vol. vii, pp. 200–201.

theory of conic sections: it demonstrated two new propositions, one of which developed the properties of a new curve, the "focale."[1] In October of this same year (1819) he was called to the chair of elementary mathematics in the Athenaeum at Brussels. Repairing thither at once, he was soon in the midst of a learned circle of Belgian and French scholars. Among the former may be mentioned the old Commandeur de Nieuport, the only Belgian scientist then known abroad, and the Baron de Reiffenberg. The French savants were refugees enjoying the hospitality of the tolerant Pays-Bas. Quetelet's intimacy with them, no doubt, helped to fix his political views and, in particular, to accentuate his leanings toward liberalism. They were a distinguished company, including such men as the poet Arnault, the artist David, the naturalist and traveler Bory de Saint-Vincent and the statesman and jurist Merlin de Douai.

In February, 1820, Quetelet was elected to membership in the *Académie royale des sciences et belles-lettres de Bruxelles.* The meetings of the Academy, at this time, were attended by scarce half a dozen Belgian scholars;[2] interest in it had almost ceased. Quetelet was soon to become its moving spirit, to arouse it to renewed activity and to make it the inspiration of a new intellectual awakening throughout Belgium. His first year in the

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[1] The discovery of this curve was hailed as a brilliant achievement by his contemporaries. From Reichesberg's essay "Der berühmte Statistiker, *etc.*," p. 422, we learn that Raoul, a colleague of Garnier's and like him a Parisian and a mathematician, compared this discovery to that of Pascal's cycloid, saying that this alone sufficed to place Quetelet's name alongside that of the great geometrician. See also Mailly, *Essai*, pp. 115 and 150.

[2] Among these were the pharmacist Kickx, the chemist Van Mons, and Quetelet's teacher and friend, Garnier, "who strongly urged the election of his favorite pupil." Mailly, *Essai*, p. 135.

Academy was marked by the presentation of two mathematical memoirs, the second of which, *Nouvelle théorie des sections coniques considérées dans le solide*, brought him much honor.

During the next nine years, or until 1829, Quetelet devoted much attention to mathematics. Physics also interested him at this time.[1] His memoirs on these subjects, published in the *Nouveau mémoires* of the Brussels Academy, and the *Correspondance* were both numerous and meritorious.[2] "The mere enumeration of his contributions to pure and mixed mathematics would occupy a very large space, and from their intrinsic merit, patient and conscientious research and earnest regard for truth, would alone have secured him a foremost place among the distinguished and scientific men of the present century."[3]

During this period appeared the first volumes of the *Correspondance mathématique et physique*,[4] with Quetelet and Garnier as joint editors. Beginning with the third volume Quetelet alone was editor. Leading mathematicians and scientists of all Europe, and particularly of England, France, Germany and Holland, were contributors.[5] In this manner Quetelet came into touch

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[1] For the flattering reception given one of his memoirs on caustics, see *Revue encyclopédique*, Sept., 1825, vol. xxvii, pp. 794–795.

[2] A general survey of them is given by Mailly, *Essai*, pp. 131–154.

[3] F. J. Mouat, "Monsieur Quetelet," *Journal of the Statistical Society of London* (1875), vol. xxxvii, p. 114.

[4] Eleven vols.: vols. i and ii at Ghent, the others at Brussels. Vols. i–vi, 1825–1830; vols. vii–viii (not located); vols. ix–x–xi, 1837, 1838, 1839.

[5] Among these were Herschel, Babbage, Wheatstone, Whewell, Chasles, Villermé, Ampère, Bouvard, Hachette, Gautier, Gauss, Hansteen, Olbers, De la Rive, Wartmann, Encke, Brandes and Hansen. Quetelet has given an account of the *Correspondance* in his *Premier siècle de l'académie royale de Bruxelles* (Brussels, 1872), pp. 36, *et seq.*

with the foremost scholars of his time. The *Correspondance* covered every branch of mathematics, as well as mechanics, astronomy, physics, meteorology and statistics.[1] The character of the contributions made this journal, for a time, the foremost of its kind in Europe.[2] Its place was gradually taken by numerous publications at home and abroad covering the special fields more intensively.

But the chief work of Quetelet during these first years at Brussels was educational. We have seen that he came to the city in 1820 as professor of elementary mathematics at the Athenaeum. Four years later he succeeded M. Thiry in the chair of higher mathematics in this institution,[3] and at the same time began giving popular courses in geometry, probabilities,[4] physics and astronomy at the Museum, Brussels. The success of these popular lectures was so marked that, after two years, the *Musée des sciences et des lettres* was organized, by royal decree, on the basis of a plan drawn up by Quetelet. In this institution he began giving a course on the history of

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[1] Numerous references in these volumes show Quetelet's early familiarity with past and current statistical development. As an instance of the influence of Jean-Baptiste Fourier, we find in a note, vol. ii, p. 177, one of Quetelet's frequent references to Fourier's statement that, "Statistics will make progress only as it is retained in the hands of those versed in higher mathematics." The first six volumes only (I have not seen volumes vii and viii) have statistical articles from Quetelet.

[2] Von John, *Geschichte der Statistik* (Stuttgart, 1884), p. 334.

[3] Meanwhile he had spent three momentous months in Paris, where he met Laplace and others, who profoundly influenced his thought. See p. 20, *infra.*

[4] His first course of instruction in probabilities was given in the scholastic year 1824–5 at the Athenaeum; this was the year immediately following his sojourn in Paris; the next year (1825–6) he gave an introductory course at the Museum.

the sciences.[1] The following very characteristic statement, which he often referred to afterwards, was made at the opening of this course:

> The more advanced the sciences have become, the more they have tended to enter the domain of mathematics, which is a sort of center towards which they converge. We can judge of the perfection to which a science has come by the facility, more or less great, with which it may be approached by calculation.[2]

He continued his courses on physics and astronomy at the Athenæum until 1828, when he resigned on account of his appointment as astronomer at the observatory. But his lectures at the *Musée des sciences et des lettres*[3] were maintained until the absorption of the *Musée* by the *Université libre* in 1834. But he was not allowed to remain long free from professional duties. Two years later (1836) he was made professor of astronomy and geodesy at the newly erected *École militaire* at Brussels.

For his courses at the *Musée* he prepared a number of elementary treatises which, on account of their clearness and exactness, obtained well-merited popularity. The first of these, *Astronomie élémentaire*[4] was soon followed

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[1] This course bore fruit in the publication by him of "Aperçu de l'état actuel des sciences mathématiques, chez les Belges," prepared at the request of the British Association and published in *Report of the British Association for the Advancement of Science*, vol. v (1835), pp. 35–36 and in *Correspondance*, vol. ix, pp. 1–47; *Histoire des sciences mathématiques et physiques chez les Belges* (Brussels, 1864), and *Sciences mathématiques et physiques chez les Belges, au commencement du xixe siècle* (Brussels, 1866).

[2] Mailly, *Essai*, p. 159; found also in "Conclusions" of *Instructions populaires sur le calcul des probabilités*, p. 230.

[3] These lectures after 1828 were in astronomy and physics.

[4] Paris, 1826.

by the *Traité populaire d'astronomie*,[1] a work of unusual merit. It was often reprinted in France and Belgium and was translated into several languages. Houzeau[2] says it was of almost epoch-making importance for the spread of the knowledge of astronomy; for, in addition to the wide circle of general readers whom it reached, it opened the way for popular instruction in the science of astronomy. It attained the distinction of being placed on the *Index librorum prohibitorum* by the Catholic Church, a fact which hastened and augmented its wide influence. About the same time he published his *Positions de physique ou résumé d'un cours de physique générale*,[3] which was translated into English by Robert Wallace.[4] The translator says in his preface, "No other work in the English language contains such an extensive and succinct account of the different branches of physics or exhibits such a general knowledge of the whole field in so small a compass."

Among these treatises, besides the *De la chaleur*,[5] was the *Instructions populaires sur le calcul des probabilités*,[6] which, Quetelet says, is "a resumé of lectures given at the *Musée* as an introduction to my courses in physics and astronomy."[7] It bears on the title-page the significant aphorism *Mundum numeri regunt*. We meet in the preface several distinctly typical thoughts. Thus,

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[1] Paris, 1827. [2] Reichesberg, "Der berühmte Statistiker," p. 433.

[3] Three volumes, Paris, 1826.

[4] *Facts, Laws and Phenomena of Natural Philosophy, or a Summary of a Course in General Physics* (Glasgow, 1835).

[5] Brussels (?), 1832.

[6] Brussels, 1828, 236pp. English translation by R. Beamish, London, 1839.

[7] Preface, p. 1. These courses and this book are of later date than his trip to Paris from Dec., 1823, to Feb., 1824. See p. 19, *et seq. infra*.

he says, "It has seemed to me that the theory (*calcul*) of probabilities ought to serve as the basis for the study of all the sciences, and particularly of the sciences of observation." "Since absolute certainty is impossible, and we can speak only of the probability of the fulfillment of a scientific expectation, a study of this theory should be a part of every man's education." The book is intended for the general reader, and the only prerequisite is a knowledge of the rules of arithmetic. In a most perspicuous manner he expounds the fundamental propositions of probabilities, Bernoulli's principle of agreement between experience and calculation, precision, the principle of least squares, the construction of a mortality table for a stationary population, and the calculation of probable and of average life. We cannot forbear another quotation:

> Chance, that mysterious, much abused word, should be considered only a veil for our ignorance; it is a phantom which exercises the most absolute empire over the common mind, accustomed to consider events only as isolated, but which is reduced to naught before the philosopher, whose eye embraces a long series of events and whose penetration is not led astray by variations, which disappear when he gives himself sufficient perspective to seize the laws of nature.[1]

As a teacher and lecturer Quetelet was very successful. He was considerate and amiable, free from pedantry and conceit, and "endowed with a true talent for exposition."[2] His courses at the Museum attracted a great number of auditors from all ranks of society. Several of his pupils at the Athenaeum afterwards became distin-

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[1] "Conclusion," p. 230; see also p. 8.

[2] Mailly, *Essai*, p. 156.

guished. Joseph Plateau, probably the most eminent of these, in dedicating to Quetelet his greatest work, *Statique expérimentale, etc.*, says:[1]

> Vous, qui avez été l' un des actifs promoteurs de la régénération intellectuelle de la Belgique, et dont les travaux ont tant contribué à l'illustration de ce pays; vous, qui avez guidé mes premiers pas dans la carrière des sciences, et qui m' avez appris, par votre example, à exciter chez les jeunes gens l'amour des recherches; vous, enfin, qui n'avez cessé d'être pour moi un ami devoué, *etc.*

Quetelet is said to have taken an almost paternal interest in those of his students who showed special aptitude. He entertained them and opened to them freely the rich treasures of his own learning.[2]

During these years of educational activity, an important series of events had taken place. Soon after his election to the Academy (1820) Quetelet began arousing interest in favor of an astronomical observatory. He made friends for the project on every hand, secured resolutions from the learned societies of Belgium and personally won the support of the minister of public instruction, M. Falck. Quetelet himself, having no experience with the methods and instruments of practical astronomy, was sent to Paris in December, 1823, at the expense of the state. He was kindly received at the Paris observatory by Arago and Bouvard, the latter of whom took special interest in instructing him in the knowledge of practical astronomy.[3]

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[1] *Bulletins de l'acad.*, 2nd series, vol. xxxvii, pp. 253-254, note.

[2] Wolowski, "Éloge de Quetelet," *Journal de la société de statistique de Paris*, vol. xv, p. 122.

[3] For Quetelet's very interesting account of his introduction at the observatory at Paris, see "Notice biographique de M. Bouvard," *Annuaire* of the Brussels Academy (1844), vol. x, pp. 112-113.

Bouvard also introduced him to an inner circle of friends. Among these were Laplace, Poisson, Alexander von Humboldt and Fresnel. It is probable that Quetelet at this time formed the acquaintance of Fourier, from whom he received some instruction.[1] During his three months'[2] study in Paris, doubtless the most significant influence on the direction and character of his thought was that exerted by the immortal Laplace. Under this great mathematician, Quetelet received instruction in the theory of probabilities.[3] This course must have exerted a profound influence on Quetelet's scientific and philosophical views. The emphasis which Quetelet laid upon the principles of probabilities in his courses at the Museum during the years immediately following this sojourn in Paris has already been noted.[4] Quetelet's

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[1] In the *Physique sociale* (Paris, 1869), vol. ii, notes, p. 446, Quetelet says, "During a temporary sojourn at Paris, about a half century ago, I had the honor of the kindly friendship of M. Bouvard, who was pleased to present me to the illustrious author of the *Mécanique céleste*, of which he was the collaborator for a part of the calculations and observations. I had the good fortune then of being able to profit by the counsel of this great geometrician and to win the friendship of several of the most distinguished scholars of France, who ordinarily grouped themselves about him. Later Jean-Bapt. Fourier, . . . was pleased also to express to me sentiments of kindness . . . I had the good fortune of enjoying the lessons of these two great masters and I still remember with gratitude the encouragement which they were pleased to give me."

[2] Von John, *Geschichte der Statistik*, p. 333, says two years, but this is undoubtedly wrong. Quetelet himself says, "I arrived at Paris towards the end of 1823" and "I returned to Belgium in 1824," in sketch of Bouvard, *Sciences mathématiques et physiques au commencement du xix^e siècle*, pp. 611-614; Mailly, *Essai*, p. 172, says that Quetelet returned to Brussels at the beginning of 1824, and that on the first of March he addressed the Academy on the establishment of an observatory.

[3] See Reichesberg, "Der berühmte Statistiker," p. 450.

[4] Pp. 15 and 17, *supra*.

writings previous to this time, show none of that emphasis on the importance of probabilities in scientific researches, which from this time on becomes more and more prominent. It would seem, therefore, that this contact with Laplace, and with others holding like views, implanted in Quetelet's mind the germs of those thoughts which afterwards developed into his conception of the social system and his methods of investigating its laws.

After his return to Brussels, the project of an observatory was advanced, but with discouraging slowness. In 1827 Quetelet was charged by the King with making the first purchase of instruments. In company with his long-time friend, Dandelin, he repaired to London. After attending to business matters, he spent a couple of months in visiting the universities, observatories and learned societies of England, Scotland and Ireland.[1] The following January he was named astronomer of the Royal Observatory at Brussels. However, delays in construction, due to differences between the city and national governments as to financial support and to the revolution of 1830, prevented his occupying the Observatory until 1832.

Meanwhile he traveled. From July to October, 1829, accompanied by his accomplished wife,[2] he made a tour through Holland and Germany. He visited numerous astronomers and men of science, inspected the chief observatories and made himself familiar with the state of astronomical science in Germany. One of the most memorable incidents of this eventful journey was Quetelet's visit with the great Goethe at Weimar. Here he

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[1] "Description des plusieurs observatoires d'Angleterre," *Correspondance*, vols. iv and v.

[2] He had been married in 1825 to the daughter of the French physician and refugee, M. Curtet, who was also a niece of the chemist Van Mons.

spent eight days, at the time of Goethe's eightieth birthday, discussing, among many things, the latter's optical theories. This afforded the greatest pleasure to Goethe, as well as to Quetelet and his wife, and led to an unusually felicitous correspondence.[1]

The following summer he made a four months' tour through Italy and Sicily, making the acquaintance of scholars and learned societies. On this trip, as also on the preceding, he made numerous observations on the strength of terrestrial magnetic currents.[2]

After his installation at the Observatory, in 1832, his life for the next forty-two years was devoted almost entirely to three major interests: the various lines of research carried on at the Observatory, the work of the Academy and his statistical inquiries. These three spheres of activity will be treated separately.

At the Observatory a vast amount of research work was organized, dealing with astronomy, meteorology and physics of the globe.[3] Quetelet had always been interested in falling stars. In his doctor's dissertation he had defended Olbers's theory of the lunar origin of aeroliths. As early as 1826 he developed a method for

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[1] Quetelet has given two accounts of the sojourn at Weimar: "Notes extraites d'un voyage scientifique, fait en Allemagne pendant l'été de 1829," in the *Correspondance*, vol. vii, pp. 126–148, 161–178 and 225–239, and "Johann Wolfgang Goethe," in *Sciences math. et phys. chez les Belges au commencement du xixe siècle*, pp. 656-669. There is another account, "Quetelet bei Goethe," in *Festgabe für Johannes Conrad* (Jena, 1898), pp. 311–334.

[2] Results published in *Nouveaux mémoires*, vol. vi, and *Correspondance*, vol. vi. He made a three months' trip through Italy and Tyrol beginning in August, 1839, at which time he gathered another series of magnetic observations.

[3] At the Observatory Quetelet had almost from the beginning two assistants, one of whom was Edward Mailly, the author of the *Essai* which has been the chief source for this sketch.

calculating the height of a meteor from two observations.[1] This plan, being well received, enabled Quetelet to organize simultaneous observations in four Belgian cities. At this time we find him emphasizing what must be considered one of his most important contributions to the various fields of science in which he labored, namely, the necessity of simultaneous observations at different points. His introduction of it here into astronomical research was followed, as we shall see, by his development of it on a large scale in meteorological and physical research and by his efforts to secure uniform international statistics. At the same time he emphasized the necessity of correcting astronomical observations for the personal equation in order to render them comparable. In 1836 his observations of falling stars led to the discovery that the nights of August ten and eleven, like those of November thirteen and fourteen, were conspicuous for meteoric showers.

Among other facts connected with his astronomical activity, we may note a series of observations of sunspots, begun in 1832; observations on tides on the coast of Belgium, undertaken at the request of Whewell in 1835; the commencement, the same year, upon the initiative of Sir John Herschel, of hourly meteorological observations at the time of the solstices and equinoxes, but, after 1841, made every two hours throughout the year; magnetic observations, begun in 1840 at the request of the Royal Astronomical Society of London, and made at five-minute intervals during one twenty-four hours each month; the erection from 1838 to 1839, at government request, of small telescopes in the five largest cities out-

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[1] See *Correspondance*, vol. i, also *Report of the British Association for the Advancement of Science*, 1833, p. 489; 1835, p. xxxviii.

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side of Brussels, and of sundials in forty-one towns, in order to guarantee uniformity of time throughout the kingdom; and the determination of the difference in longitude between Greenwich and Brussels. The publication of the *Annuaire* and of the *Annales* of the Observatory began in 1834. In 1854 a volume entitled *Almanach séculaire* was issued from the Observatory. After 1857 the work of the Observatory was carried on largely by Quetelet's only son, Ernest, who became an accomplished astronomer and his father's successor as director.

But Quetelet's dominant scientific interest seems to have been other than strictly astronomical. The study of meteorological and physical phenomena, especially their periodicity, absorbed much of his attention. These observations began with the temperature of the earth,[1] and the intensity of atmospheric electricity and were extended to include the variations of barometric pressure and periodic phenomena of the life of plants and animals.[2] His study of atmospheric electricity and its annual and diurnal variations, established the law of the variation of intensity with height. This study was looked upon as of considerable importance by French, German and English scientists.[3] Wheatstone and Faraday made it the subject of special reports to the British Association and the Royal Society respectively.[4]

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[1] Suggested by Fourier's *Mémoire sur les températures du globe terrestre et des espaces planétaires* (Paris, 1827).

[2] Many of these studies, first published in the *Annales* of the Observatory and in the *Mémoires* of the Academy were brought together in *Sur le climat de la Belgique* (2 vols., 1849-1857).

[3] See *Archives des sciences physiques et naturelles* (Geneva, July, 1849).

[4] See *Report of the British Association* (1849), vol. 19, "Transactions of the Sections," pp. 11-15.

More important by far were the observations of barometric pressures leading to the discovery of atmospheric waves.[1] He had conceived the advantage of simultaneous observations in various places in dealing with matters of climatology. Securing the assistance of scientists throughout Belgium, and later throughout Europe, he secured a mass of observations of hourly barometric pressures. When these were chartered they revealed the succession of variations in pressure due to atmospheric waves. This study[2] of the form, size and velocity of atmospheric waves was pioneer. When carried out on the basis of simultaneous international observations, this discovery led to most important consequences for our knowledge of storms and probable weather conditions.[3] A long stride was made toward international coöperation and uniformity by the Sea Conference, held at Brussels in 1853.[4] Ten states were represented and Quetelet was chosen president. Further advance was made in 1873 at the first International Meteorological Congress,[5] an assemblage Quetelet had long desired to call. He was represented by his son, and his plan for the observation of natural phenomena was made the central theme of discussion.

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[1] He was probably led to such research by the suggestion of Sir John Herschel. But Quetelet organized independently five stations in Belgium and later seventy scattered over central and western Europe, whose observations were forwarded and tabulated at the Brussels Observatory. See *Bulletins de l'acad.*, 2nd Series, vol. xxxviii, p. 838.

[2] Published in the *Annales* of the Observatory, vol. viii, part I.

[3] See quotation, Mailly's *Essai*, p. 253, from the *Annuaire de la société météorologique de France*, 1867.

[4] The suggestion for this conference came from Matthew Maury, of Washington. At his suggestion Quetelet induced the Belgian government to call the conference, "to establish a uniform system of meteorological observations for the sea." Mailly, *Essai*, p. 224.

[5] At the World's Exposition at Vienna.

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In close connection with these observations were those made on the periodic, annual and diurnal, phenomena of plants and animals. These had been begun in 1839 by a study of the time of blooming of flowers, and were extended in 1841 to include the time of foliation and of falling leaves. In this work, leading to many interesting and significant correlations, he enlisted the coöperation of scientists in every country of western Europe. For this purpose, Quetelet prepared in 1842 an extensive scheme of investigation[1] embracing meteorology, physics of the globe, and the annual and diurnal habits of plants and animals.[2]

De la Rive, in reviewing *Sur la physique du globe*,[3] attributed the highest importance to these studies in meteorological and terrestrial physics, placing Quetelet in the "first rank among meteorologists."[4] Reichesberg remarks that there are few physicists who have advanced the development of meteorology and physics of the globe to such an extent as Quetelet.[5] The great merit of these studies is found in the admirable plan for the study of periodic phenomena, particularly in the continued insistence on the simultaneous observation of the same phenomena from many scattered points. He was the first to collect material in such manner and quantity as made possible the discovery of regularity where the human

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[1] For this plan see *Bulletins de l'acad.*, 1st Series, vol. ix, part I, pp. 65-95.

[2] Results published annually in *Nouveaux mémoires* of the Academy beginning with vol. xv.

[3] Published in the *Annales* of the Observatory (1861), vol. xiii; also separately Brussels, 1861.

[4] *Archives des sciences physiques et naturelles* (Geneva, 1862, vol. xv, July).

[5] "Der berühmte Statistiker," p. 442.

mind had previously found only chance. The wonderful scientific imagination of the man is strikingly shown in his conception of a world physics as presented in his *Sur la physique du globe* and his *Météorologie de la Belgique comparée à celle du globe.*[1] Here was a vast conception, embracing in its realization the most complete observations of the magnetic, meteorological, animal and vegetable phenomena of the entire earth on a systematic and uniform basis with a view to discovering the order in a vast mass of apparently disordered events.

We take up now Quetelet's connection with the Academy. Chosen to membership in 1820, he soon came to play a leading rôle in its activities. He was named director for the years 1832 and 1833, and was chosen perpetual secretary in 1834. This office he held for forty years, during which he was the "guiding spirit"[2] of the Academy. "He so ruled his little republic as to secure the regard, esteem and veneration of all within its walls, . . ."[3] At his suggestion, the Academy began the publication of its *Bulletin* in 1832, and three years later, as secretary, he brought out the first volume of the *Annuaire.* When the Academy was reorganized in 1845,[4] Quetelet secured the addition of the class of Beaux-Arts.[5] This he had attempted in 1832. Having failed

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[1] Brussels, 1867.

[2] Mouat, "Monsieur Quetelet," *Jour. Stat. Soc. of London,* vol. xxxvii, p. 114; see also "Discours," pronounced at Quetelet's funeral. *Bulletins de l'acad.*, 2nd Series, vol. xxxvii, p. 249.

[3] Mouat, *loc. cit.*

[4] It was known as "l'Académie royale des sciences et belles-lettres de Bruxelles" until 1845, and since then as "l'Académie royale des sciences, des lettres, et des beaux-arts de Belgique."

[5] He seems to have had a natural and decided taste for art. He first came into public notice as a youth through the exhibition of the prize drawing at the Lyceum at Ghent in 1812.

he contented himself with assisting in the organization of the *Cercle artistique et littéraire*, of which he was for some time the president. As secretary of the Academy he was always prompt and painstaking in fulfilling his duties. Fifteen days before his death, though already suffering from his death malady, he attended the session. "In his appreciations of the works of his fellows, he was usually fair-minded, but superficial."[1] Many of his own articles were first published by the Academy, and it was largely through the medium of the Academy that Quetelet became the stimulator of a new intellectual life in Belgium. There are many testimonials to his stimulating influence. He was declared, at his death, to be virtually the creator of the Academy, as also of the Observatory and other scientific and educational institutions, all potent in the intellectual regeneration of Belgium.[2]

But, though Quetelet's influence in and through the Academy and his researches in meteorology and terrestrial physics are of importance, he became known to the world through, and will be remembered chiefly for, his statistical studies. After 1825 his articles dealing with every phase of statistics became more and more prominent among his various publications. Since these writings are to be studied in some detail in later chapters, we will give here a sketch only of his practical activity with reference to official statistics.

Upon the formation of the statistical bureau of Holland under Smits, in 1826, Quetelet became correspondent for Brabant. He at once urged that a census be taken and assisted in formulating plans for the census of 1829. The results of this census were published

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[1] Mailly, *Essai*, p. 261.

[2] See "Discours," pronounced at his funeral, *Bulletins* of the Academy, 2nd series, vol. xxxvii, pp. 244–266.

separately in each country after the revolution of 1830.[1] He later became supervisor of statistics in the administration, and in 1841 he was instrumental in the organization of the *Commission centrale de statistique.* This Commission, of which he was president until his death, supervised the subsequent censuses, organized the work of the provincial commissions, and brought the Belgian statistics to a standard of completeness and reliability that was pre-eminent. Wolowski said, in 1874, that "the success of the Commission, thanks to Quetelet, was so great that many nations . . . hastened to found a central commission of statistics patterned after that which he had founded."[2]

Meanwhile, as official Belgian delegate to the meeting of the British Association at Cambridge, in 1833, he had been the immediate cause of the formation of a statistical section.[3] This section was put in charge of a permanent committee, having Babbage as chairman and Quetelet as one of its members. Quetelet considered the scope of this section too narrowly limited by the rules of the Association. "He accordingly suggested to M. Babbage, from whom we have the statement, the formation of a statistical society in London."[4] This society was

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[1] *Recherches sur la reproduction et la mortalité de l'homme aux différents âges, et sur la population Belgique* (*premier recueil officiel*) *par MM. Quetelet et Smits* (Brussels, 1832).

[2] "Éloge de Quetelet," *Jour. de la soc. de sta. de Paris,* vol. xv, p. 120.

[3] See *Report of the British Association,* 1833, p. 484; also Quetelet, "Notes extraites d'un voyage en Angleterre en 1833." *Correspondance,* vol. viii.

[4] F. J. Mouat, "History of the Statistical Society of London," *Jour. Sta. Soc. of London,* Jubilee vol., pp. 14–15. See also in the same *Journal,* vol. i, p. 4; vol. xxxiv, p. 412, and vol. xxxvii, pp. 309 and 415; and F. X. Neumann-Spallart, "Aperçu historique," in the *Bulletin de l'Institut international de statistique.* vol. i, pp. 1–2.

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founded March 15, 1834, and the same year Quetelet was elected a corresponding member of the British Association.

The need of international uniformity and comparability of statistical data impressed itself deeply upon Quetelet, as had the similar need with respect to astronomical and meteorological data at an earlier date.[1] With characteristic zeal he sought to bring about the practical realization of this highly important end. The idea of international coöperation, bearing the approval of the *Commission centrale,* was presented to a group of scientists at the Universal Exposition at London in 1851. The project met with heartiest approval. Brussels was designated as the place of meeting for the first session because of the excellence of the Belgian statistics. Further proceedings devolved on the *Commission centrale.* A committee was chosen to draw a plan of organization, prepare rules of order and propose questions. As chairman of this committee, Quetelet became the moving and directing force in what followed. The government was induced to issue invitations to an International Statistical Congress, plans of organization were drawn providing for three sections, and a set of eleven questions was proposed for discussion. At the first session of the Congress, Brussels, 1853, Quetelet was chosen president, and in his opening address he dwelt upon the advantages of international uniformity in plans, purposes and terminiology of the official statistical publications.

The Congress was a decided success and other sessions followed. The influence of this Congress on both the theory and practice of statistics was immense. Meitzen[2]

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[1] Pp. 23 and 25, *supra.*

[2] August Meitzen, *History, Theory and Technique of Statistics,* tr. by Roland P. Falkner, *Supplement to Annals of the American Academy of Political and Social Science* (March, 1891), p. 81.

says, "Everything which has occurred for statistics[1] since the beginning of the Congress has been essentially a consequence of its stimulating and invigorating influence." Ficher, in opening the *Statistische Monatschrift*[2] with a sketch of Quetelet, says "International Statistics will ever remain Quetelet's most splendid creation." Quetelet was a prominent figure at all but two sessions of the Congress;[3] Wolowski tells us that "it was always the spirit of Quetelet that animated them."[4] We see him at the age of seventy-six, upon urgent request, repairing to St. Petersburg to the last but one of these sessions. And we see him returning, refreshed and rejuvenated by the splendid ovation he had received.[5] This was one of his greatest triumphs and was to him a source of deepest gratification.

Before closing this sketch, mention should be made of an attack of apoplexy from which Quetelet suffered in the summer of 1855. He was stricken suddenly while studying on the veranda of his home at the Observatory. He recovered strength in a few weeks to resume his labors, but his intellect had lost its acuteness, his memory its certainty and his literary style much of its beauty and eloquence. His writings, for a long time, needed the most thorough revision. Mailly, who was one of his assistants at this time, tells us that he would use the same word over and over again, and would express the same thoughts with monotonous repetition. He even

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[1] Meitzen must mean official statistics.

[2] Vienna, 1875, vol. i, p. 13.

[3] Paris, 1855, and the session after his death, Budapest, 1876.

[4] "Éloge de Quetelet," *Jour. de la soc. de sta. de Paris*, vol. xv, p. 120.

[5] See "Obituary Notice," *Jour. Stat. Soc. of London*, vol. xxxvii, p. 115.

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constructed sentences whose ends bore no relation to their beginnings, and, when such were corrected, Quetelet would be unconscious of change.[1] His books published after 1855, in so far as new in composition, are full of ambiguous or unintelligible phrases, ill-arranged and very repetitious. This is notably true of his histories of 1864 and 1866,[2] and his works on meteorology,[3] as well as of some of his statistical writings. His affliction was intensified by the death of his wife and of his only daughter. Yet, in time, he very largely regained his former eagerness of spirit and worked on to the end with unabated intensity and care. In his latest years, further saddened by the loss of some of the younger spirits about him, he became more and more absorbed in his daily labors. He had for so many years guided the work of the Academy and the Observatory, that it is little to wonder at, that they were the burden of his incoherent mumblings in the brief spell of deliriousness preceding his death.

His life was crowned with honors. He was a member of more than one hundred learned societies, and had been decorated with the badges of many royal and honorable orders of all lands. Among the learned societies were academies of science, institutes, royal societies, and medical, statistical, geographical, meteorological, anthropological, philosophical, physical and astronomical societies the world over.[4] The *Académie des sciences morales et*

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[1] Mailly, *Essai*, p. 266, and Reichesberg, "Der berühmte Statistiker," p. 460.

[2] To those mentioned in note p. 16, *supra*, should be added *Premier siècle de l'académie* (Brussels, 1872).

[3] Among these were: *Sur le climat de la Belgique* (Brussels, 2 vols., 1849–1857); *Physique du globe* (*ibid.*, 1861); *Météorologie de la Belgique comparée à celle du globe* (*ibid.*, 1867).

[4] Ficher, *Statistische Monatschrift*, vol. i, p. 13, says that, aside from

politiques of Paris bestowed upon him its highest honor by electing him an associate in 1872. At the same time the Academy of Sciences of Berlin hailed him as "the creator of a new science."[1] Reichesberg observes that as the founder of a new statistics he developed the scientific method by which the laws of social life may be discovered, and thus established the foundation of a new science, Social Physics, as he himself called it, or Sociology, as it is customarily called today.[2] Doubtless one of Quetelet's greatest merits lies in his development of moral statistics. Of this development two features are of lasting significance. One of these is the development of a method of investigation having a mathematical basis in the theory of probabilities. The other is found in the emphasis on the word moral. Others had studied birth, death and marriage statistics, but Quetelet was the first to perceive in such studies a field that could be expanded to include the whole nature of man and the characteristics of human society. The simple proposition that the moral nature of men and the qualities of a group of men can be best determined by a statistical study of their actions was exalted by him into the foundation of exact social science.

Quetelet's personality is represented as most winning. Modest and generous, convinced but respectful of others' opinions, always calm and considerate, a man of broad learning and an attractive conversationalist, he won and kept friends wherever he went. A man of excellent tact,

learned societies of Belgium, he was a member of ninety-six in Europe, one in Asia, one in Africa, and nine in North and South America. For a list of these societies see *Bulletins de l'acad. roy. de Belg.*, 2nd series, vol. xxxvii, pp. 246 and 265.

[1] *Bull. de l'acad.*, 2nd series, vol. xxxvii, p. 257.

[2] "Der berühmte Statistiker," pp. 443-444.

as well as of tremendous enthusiasm, he readily enlisted support for many schemes of coöperative scientific endeavor. A man of wide intellectual interests, and at the same time, endowed with a prodigious capacity for labor, he contributed to the advancement of several sciences, aroused anew the entire intellectual life of his country and stimulated the activity of artists and scientists throughout the world. Until the attack of 1855, he is represented as always animated and genial, fond of wit and laughter. "Rabelais was almost as dear to him as Pascal."[1]

His home life was of marked beauty and serenity. He found great pleasure in his two children, and the astronomical ability of his son was a source of great pride to him. Quetelet was himself a modest musician, and his wife an accomplished one. Friends were regularly entertained at dinner on Sundays, and Sunday evenings were usually given over to music and charades. Personally acquainted with the leading scientists of his time, he exercised the most generous hospitality in the home at the Observatory. Distinguished men, coming to Belgium from any of the European capitals or centers of learning, brought letters of introduction to Quetelet and were always assured a gracious reception by him. One of the speakers at his funeral said of him, "as a man of science he was admired; in political affairs he was respected; in private life he was beloved."[2]

He died on the seventeenth of February, 1874, and was buried with honors fitting one of earth's nobility. His funeral was the occasion of a most numerous and distinguished gathering of members of royal families,

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[1] Mailly, *Essai*, p. 262.

[2] *Bulletins* of the Belgian Academy, 2nd series, vol. xxxvii, p. 261.

scientists, men of letters and representatives of learned societies. Funds for a statue of him were soon raised by popular subscription, the monument being unveiled at Brussels in 1880. He is represented seated in an armchair, the fingers of his left hand spread out on a nearby globe; his right arm rests on the arm of the chair and his head is raised as he peers into the secrets of space.[1]

The extent of Quetelet's scientific activity was so great, covering as it did the various fields of mathematics, astronomy, physics and statistics, that his rank among men of science is difficult to estimate. It may be said without fear of contradiction that few men have so largely contributed to the spread of scientific knowledge or stimulated such wide and persistent discussion and inquiry as did he. One historian says of him, "In the history of natural science, Quetelet will, with good right, be placed in the rank of Pascal, Leibnitz, Bernoulli, Laplace, Poisson and such scientists."[2]

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[1] Reichesberg, "Der berühmte Statistiker," p. 460.

[2] Von John, *Geschichte der Statistik*, p. 335.

CHAPTER II

QUETELET IN THE HISTORY OF STATISTICS

It is proposed in this chapter to relate Quetelet to the historical development of statistics previous to 1825, when he began to show some statistical activity. This development can be traced through two series of writings, showing different conceptions and methods. One series includes the works by Muenster, Conring and Achenwall and his disciples; the other, works by Graunt, the School of Political Arithmetic, Derham and Süssmilch. Those of the first series embrace the whole life and organization of the state as their object, and rely on verbal analysis and description. Those of the second are relatively limited in scope and use enumeration and calculation as distinctive methods. The conception, scope and method of each of these two classes of statistical writings will be briefly traced, and Quetelet's contribution to their further development and transformation stated.[1]

Since nations began there have been records of a statistical character. The rise of modern nations, with the growing sense of national unity and of international jealousy, gave rise to comprehensive descriptions of

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[1] For general guidance the following works have been used: Von John, *Geschichte der Statistik, erster Teil, von dem Ursprung der Statistik bis auf Quetelet* (1835), (Stuttgart, 1884); August Meitzen's *History-Theory and Technique of Statistics*, tr. by Roland P. Falkner, *Supplement to Annals of the American Academy of Political and Social Science*, March, 1891.

nations and estimates of their relative resources in men and materials of war. Meitzen[1] finds the first of these in the *Cosmographia* (1536 and 1544) of Sebastian Muenster. This work treated systematically Europe, Asia and Africa, covering the geography, history, manners and customs, industries, commerce, political and ecclesiastical organization, and military power of all known countries. This was followed by others of the same nature,[2] which furnished the basis for the development of statistics as a discipline in the German universities. The first university lectures of such character were those of Herman Conring[3] (1606–1681). These lectures were begun at the University of Helmstädt in 1660 and were published first in 1668, but in best form, posthumously in 1730.[4] Volume four of the latter edition treats of "*Statskunde*" or "*notitia rerum publicarum*."

According to Conring the *notitia rerum publicarum* treat of the condition of individual states in whole or in part, and properly should be confined in time to the present. The chief aim is to gain a knowledge of the state for the guidance of practical statesmen. For this reason they treat not only facts, but causes. Conring, being scholastic in his treatment, gives as causes the Aristotelian classification. The material causes are land and people; the formal and final are the kinds of union, such as government and administration, with reference to special objects of state; and the efficient causes are the revenues and land and sea power. Conring's work is

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[1] *Op. cit.*, p. 20.

[2] See especially Von John, *op. cit.*, p. 34, *et seq.*

[3] Meitzen, p. 21; John, p. 52; Block, *Traité théoretique et pratique de statistique* (2nd ed., Paris, 1886), pp. 4-5.

[4] This work was entitled *Exercitatio historico-politica de notitia singularis alicujus reipublicae.*

worthy of much emphasis. It was the first notable attempt at the systematic presentation of both the theory and the material of political statistics. The form he gave to such presentation was lasting. John observes that "a comparison of the theories set forth a century later by Achenwall, Von Schlözer and followers always discloses again this scholastic system formulated by Conring."[1] For this reason "the great German poly-histor of the seventeenth century can alone be called the 'father' of this[2] form of statistics."[3]

Meitzen, however, falls in with the custom by designating Achenwall (1719–1772) "the father of statistical science."[4] Achenwall tells us[5] that his first statistical work was his *Vorbereitung zur Statswissenschaft der europäischen Reiche,* published in 1748. This appeared as the introduction of a work of the year following, entitled *Abriss der Statswissenschaft der europäischen Reiche.*[6]

The advance of Achenwall over his predecessors was in more systematic treatment and more exact definition. This is evidenced by the manner in which he takes up the theoretical problems. "Before we begin to observe the constitution of the most important European states of to-day, it will be fitting to make some general remarks

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[1] *Op. cit.*, p. 61.

[2] The word "this" evidently refers to the German university statistics.

[3] *Ibid.*, p. 70.

[4] *Op. cit.*, p. 22. See Block, *op. cit.*, p. 7.

[5] *Statsverfassung der heutigen vornehmsten europäischen Reiche und Völker im Grundriss*, edited by M. C. Sprengel (Göttingen, 1st pt., 1790, 2nd pt., 1798), *Vorrede zur ersten Ausgabe.*

[6] This ran through five editions in the author's lifetime; a sixth was brought out by Von Schlözer in 1781. References here are to the seventh edition by Sprengel, the *Statsverfassung* mentioned in the preceding note.

on 'Statistik,'[1] as that discipline which is concerned with this object; to set forth its meaning, limit and divisions and its natural connections; as also to indicate briefly the uses, the history and the sources of the same."[2] In observing a state, Achenwall says that he finds many things which notably advance or hinder its prosperity. "Such things can be called Statsmerkwürdigkeiten"[3] (the noteworthy things of a state). "The totality of the actual 'Statsmerkwürdigkeiten' of a kingdom or republic makes up its constitution in the broadest sense; and the account of the constitutions of one or more states, treated individually, is 'Statistik, (Statskunde), oder Statsbeschreibung.'"[4] 'Statistik' studies the life of a state with a view of ascertaining its sources of weakness and strength.[5] It will not include all facts of interest regarding a state, but only such as are important for "politische Kenntniss,"[6] that is, 'Statistik' seeks to obtain, through a description of the state, a guide for the statesman.[7] Though thus limited, 'Statistik' still included much that later became differentiated, as geography, ethnography, public and administrative law and political economy. Achenwall's work was translated into many languages and his definition of statistics thus came into general use.

'Statistik' thus owed the fixity of its definition to Achenwall, but there was little change in the real character of the discipline from the very early time of Muenster to the beginning of the last century. Von Schlözer epitomized the definition,[8] and he and other representa-

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[1] He first uses this word in the "Vorrede" of the first edition.

[2] *Vorbereitung*, p. 2. [3] *Ibid.*, p. 4. [4] *Ibid.*, p. 5.

[5] *Ibid.*, p. 6. [6] *Ibid.*, p. 6. [7] *Ibid.*, p. 46.

[8] "*Statskunde ist eine stillstehende Statsgeschichte; so wie diese eine fortlaufende Statskunde*," *ibid.*, p. 5, in brackets.

tives of the school made such improvement in the analysis and arrangement of results as the continued enrichment of material suggested. Both the theory and the method were simple. This school of statisticians believed the possibilities of their science were exhausted by a verbal description of a contemporary social condition, so arranged as to be useful to statesmen, and accompanied by general observations on the results. But an almost revolutionary change was impending. A symptom of this change is found in the works of Ancherson[1] (1741) and Büsching[2] (1758). Though Achenwall had stated that knowledge of the strength of a nation would require a comparison of its resources with those of other nations,[3] these men were the first to make such comparisons directly. Moreover, they used, so far as possible, numerical tables drawn from official sources. Besides, Büsching gave slight space to the geography, constitution and administration of the countries described and emphasized the economic and material factors of social life.

But the real change followed the establishment of statistical bureaus and the publication by them of the results of censuses and inquiries. "Die Tabellen-Statistik" quickly came into vogue. A tragic, but bloodless, warfare ensued between the orthodox statisticians and the worshipers of rows of figures.[4] The latter had the assistance of continuous new recruits in the form of large quotas of official numerical data, which could not fail of

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[1] Von John, *op. cit.*, p. 88.

[2] Meitzen, *op. cit.*, p. 24, *et seq.*, and p. 41.

[3] *Vorbereitung*, pp. 47–48.

[4] The followers of Achenwall claimed that their statistics were "the right eye of political science," and accused the table statisticians of reducing statistics to a "veritable cadaver, on which one could not look without abhorrence," Von John, *op. cit.*, p. 129.

effect. When the atmosphere cleared it was found that a considerable change had been wrought in the character of descriptive statistics. 'Statistik' disappeared as a university discipline and was replaced by two rather distinct kinds of descriptive material in which numerical tables and verbal explanation divided honors. These two were the official statistical publications, and the statistical compendiums prepared mostly by private enterprise.

Much of Quetelet's activity was connected with perfecting these two kinds of statistical works. His own definition of statistics[1] evidently restated that given by Achenwall and Von Schlözer, and the objects of statistical inquiry, as given by him[2] were those treated by this school. But we shall see that it was primarily his own activity that led to the conception of statistics as a method of observation based on enumeration and applicable to any field of scientific inquiry. It is impossible to state just what elements in the betterment of descriptive statistics were due uniquely to Quetelet, but he contributed to the development in the following ways: (1) perfection of plans for census taking; (2) criticism of sources; (3) arrangement of materials; and (4) progress toward uniformity and comparability of data.

Quetelet's direct interest in public statistics dates from his appointment in 1826 as correspondent for Brabant to

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[1] *Letters on the Theory of Probabilities, as Applied to the Moral and Political Sciences, translated from the French by O. G. Downes* (London, 1849), pp. 176, 179, 180, 182.

[2] *Ibid*,, p. 183. Note also headings treated in "Recherches statistiques sur le royaume des Pays-Bas," *Nouveaux mémoires de l'académie royale des sciences et belles-lettres de Bruxelles*, vol. v (1829), and the elaborate *Statistique internationale, Bulletin de la commission centrale de statistique* (Bruxelles), vol. x (1866).

the statistical bureau of Holland. His connection with the early censuses of Holland (1829) and of Belgium (1832), his position as supervisor of the statistics of the administration and later as president of the *Commission centrale*, made it possible for him to impress a high character of excellence on the statistical publications of his own country. He gave careful consideration to the collection of data, both as to the blank forms to be used and as to the nature of the questions to be asked, to the tabulation and forms of presentation of the material, to methods of averaging and summarizing data, and to the criticism, both of the sources and of the results of the investigation.

The practical rules developed by him still form the essential guides in census taking.[1] His predecessors had given some attention to the criticism of results, but Quetelet assisted materially in the advance of criticism of sources. "Statistics are of value only according to their exactness. Without this essential quality they become useless, and even dangerous, since they conduce to error."[2] He insisted that every statistical work should give both the sources of the data and the manner of their collection. The checking of statistical documents, he held, should be both moral and material.[3] By moral examination he meant an inquiry into the influences under which the data are collected and the nature of their sources. The material examination consists in observing whether the numbers are sufficiently large to assure the predominance of constant causes, and sufficiently continuous or uniform to make certain that accidental causes have not unduly influenced some of them,

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[1] See *Letters*, p. 195, *et seq.*

[2] *Ibid.*, p. 198.

[3] *Ibid.*, "Letter xxxix."

and whether they have been combined with mathematical accuracy. As to the arrangement and presentation of results, Quetelet made progress both in official documents, so as to secure clearness and ready comprehensibility, and in scientific studies, so as to show the greatest possible number of correlations. To group the data so that permanent factors would be thrust into prominent view, and so as to make comparisons on the basis of time, place, sex, age, *etc.*, easily possible, were essential principles with him. The study of correlations, the attempt to find the causal relations of phenomena, marks a very great advance over the works in this particular line of statistical development. Such studies required the development of a more precise technique, which, in turn, reacted on the criticism of sources and gave to descriptive statistics a deeper significance. It is precisely at this point that descriptive statistics felt most decisively the influence of the statistics begun by the School of Political Arithmetic. And it is in and through the work of Quetelet that this influence was first clearly exerted. That is, the development of official statistics furnished more abundant numerical data, and the elaboration by Quetelet of a method for treating such data made possible the correlation of statistical results with economic and social conditions and the consideration of questions involving the public weal. The disciples of Achenwall had upbraided the table statisticians with neglecting the consideration of the deeper questions of social life. They failed to recognize the necessity of precise data, of number and measure, in order to draw reasonably correct and at the same time significant conclusions on such questions.

Finally Quetelet contributed to the progress toward uniformity and comparability in official statistics. By

comparability he meant two things, namely, (1) uniformity of all data collected under a given schedule for one time and place, and (2) uniformity of all data under a given schedule for different times and places.[1] Uniformity of the first sort is absolutely essential to the validity of any conclusions whatever. Uniformity for different times makes possible the measurement of the change in a social condition within a nation through a period of time, while uniformity for different countries makes possible the direct comparison of social conditions in these countries. Quetelet would not only test the progress of his own country but he dreamed of presenting in comparable data the status and the progress of all nations. Hence his leadership in the organization of the International Statistical Congress. In his opening address, as well as in the formulation of the plans for the first session, Quetelet sounded the keynote of this movement in his emphasis on international uniformity. He felt keenly the need of comparability among the official statistics of western nations. This end was to be realized through the collection of material on the basis of a common plan, following similar instructions, classifications and schemes of presentation and using the same terminology. This end is still far from realization, but there can be little doubt that through this Congress Quetelet influenced, directly or indirectly, the statistics of many nations. The value to science of the realization of international uniformity would be immense, inasmuch as it would make possible a multitude of correlations and comparisons that are now either dangerous or altogether impossible.

Another line of statistical development gave rise to

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[1] *Letters*, p. 177.

very different conceptions and methods. In 1662 Captain John Graunt, F. R. S. (1620–1674) presented to the Royal Society his *Natural and Political Observations upon the Bills of Mortality with reference to the Government, Religion, Trade, Growth, Air, Diseases, and the several changes of the City of London.*[1] This work has not been sufficiently emphasized by the historians of statistics. As a scientific study of population it was not surpassed until the appearance of Süssmilch's work, eighty years later. It contains the first presentation of a number of the inductions from population statistics, which Quetelet presented much more convincingly and impressively in *Sur l'homme,* published in 1835. Graunt found that the deaths due to various diseases and even to certain kinds of accidents "bear a constant proportion unto the whole number of burials."[2] He pointed out the constancy in the number of abortions and still-births;[3] the variation of the death rate by seasons;[4] the ratio of births to deaths in city and in country;[5] and the ratio of male to female births;[6] he also presented the rough outline of a table of mortality.[7]

The interesting feature of Graunt's work is not the approximate accuracy of his conclusions, but the method he followed. He was permeated with the Baconian philosophy and sought truth through observation rather than speculation. His conclusions were faulty both because of the incompleteness of his data and his utter lack of comprehension of the law of large numbers. His mortality table is, in fact, only a piece of rational guesswork. But his book stimulated the widest interest, and,

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[1] References here are to the 5th edition, London, 1676.

[2] *Ibid.*, p. 26.

[3] *Ibid.*, p. 41.

[4] *Ibid.*, p. 56.

[5] *Ibid.*, p. 57, *et seq.*

[6] *Ibid.*, pp. 87, 103-104.

[7] *Ibid.*, pp. 83–84.

above all, opened the way for a new method of studying social life, namely, observation, enumeration and calculation. It is with Graunt, in fact, that we find the beginning of statistics as a method of observation in the service of inductive social science.[1]

Petty's first researches were stimulated by Graunt's *Observations*, which he designated as "a new light to the world."[2] Petty was dominated by the same empirical philosophy; he would "use only arguments of sense," and would express himself in terms of "number, weight and measure."[3] Owing to the dearth of accurate enumerations he resorted to calculation, as, for example, the estimation of the number of inhabitants from the number of houses, or from the number of deaths. He appreciates the value of an average of several such computations, and "pitched the medium"[4] between extreme estimates.

The cultivation of Political Arithmetic, "the art of reasoning by figures upon things relating to government,"[5] was continued, notably, by Davenant, Arbuthnot and King. The essays of these writers were used by Sir Wm. Derham, F. R. S., in his *Physico-Theology; or a Demonstration of the Being and Attributes of God from his Works of Creation.*[6] This work is an elaborate argu-

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[1] For an excellent estimate of Graunt's influence see *The Economic Writings of Sir Wm. Petty* (Cambridge, 1899), by Chas. H. Hull, vol. i, pp. lxxv-lxxix. He traces this influence through Derham, Süssmilch and Malthus to Darwin.

[2] *Observations upon the Dublin Bills of Mortality* (1681), to be found in *Several Essays in Political Arithmetick* (London, 1699), p. 55.

[3] *Ibid.*, "Preface."

[4] *Ibid.*, p. 123.

[5] Davenant, *Discourses on the Public Revenues, and on the Trade of England* (London, 1698), pt. I, "Discourse I," p. 2.

[6] London, 1699.

ment from design. He finds in the admirable proportions of marriages to births, of births to deaths, of males to females, the surest evidence of "the work of One that ruleth the World."[1] The perusal of Derham's *Physico-Theology* by Süssmilch, led him to undertake researches on the number of births, deaths and marriages according to the lists of the city of Breslau.[2] Meanwhile, he sent to England for the writings of Graunt and Petty.[3] His writings, especially the second edition,[4] proved to be a great advance upon the preceding, not only in the variety and exactness of conclusions, but also in the clearer connection between the concrete phenomena of social life and economic conditions.

Moreover, he made distinct advances in method. Upon those wishing to controvert his conclusions he imposes the following conditions:

> (1) The lists must be correct, else contradiction is of no value. To this end it is necessary to consider well the conditions and changes of a place, to see whether war, plague or other disease has wrought any variation. (2) The numbers must not be small; the greater they are and the more years included thereunder the better. . . . If I have a hundred cases in support of my conclusion, then can nothing to the contrary be drawn from one case.[5]

It was, in fact, only by observing large numbers that he

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[1] Eighth edition (London, 1727), bk. iv, chap. 10, "Of the Balance of Animals or the Due Proportion in which the World is stocked with them."

[2] *Die göttliche Ordnung in den Veränderungen des menschlichen Geschlechts* (Berlin, 1st ed., 1742), "Vorrede," p. 13.

[3] *Ibid.*, p. 16.

[4] 2 vols., Berlin, 1761 and 1762.

[5] First edition, "Vorrede," pp. 38-39.

could ascertain the great regularities in mathematical ratios which represented to him "the rules of order which God's wisdom and goodness have established."[1]

These quotations show Süssmilch's recognition in a general way, of three principles highly important for the development of statistical method, namely, (1) Social phenomena have causes; (2) the regularities found in statistical results reveal the rules of the existing social order; and (3) constancy in results can be obtained only by viewing large numbers.[2] All of these principles are found in the work of Quetelet. It required only a change from a theological to a scientific viewpoint to expand the first of these principles into a complete denial of chance and the assertation of an absolute solidarity in the sequence and the co-existence of social phenomena. Such a view became a philosophical tenet, and was a favorite doctrine of Quetelet's great friend and teacher, Laplace. It appears in Quetelet's writings in the form, "effects have causes and are proportioned to them," a form which suggests the theory of probabilities. The second of the above principles remained without emphasis until Quetelet sought to find in the statistical regularities the laws of a social mechanics. The third was definitely recognized in the construction of mortality tables by Halley, Deparcieux, Wargentin and Kersseboom, and was well established as the "law of large numbers" by the development of the mathematical theory of probabilities.

Coming down to the early years of Quetelet's life we find the most significant influences on the course of development of the statistics of population and of statistical

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[1] Second edition, vol. i, title page.

[2] On this see *ibid.*, vol. ii, pp. 262 and 408.

method in the works of Malthus, Laplace and Fourier, all of whom Quetelet knew personally. Malthus's *Essay on Population*, though apparently not influenced by Süssmilch's *Göttliche Ordnung*, gave a world-wide stimulus to the study of population in its economic and social aspects. Laplace continued the development of the theory of probabilities and instructed Quetelet therein. Fourier's influence was exerted through the *Recherches statistiques sur la ville de Paris et le department de la Seine.*[1] The first four volumes of this series have introductory essays by Fourier of very great value. In the first of these, *Notions générales sur la population*,[2] he develops both algebraic and geometrical expressions for tables of population and of mortality, average duration of life and expectation of life, assuming the population to be stationary. He points out the greater accuracy of results when age groups of one-half year or one month, instead of one year, are taken. Several principles of probabilities are stated and applied to the study of population. He inquires into the causes affecting the growth of population and classes these as general and fortuitous. He shows clearly the advantages of large numbers, and especially of averages deduced from a series of such numbers extending over several years. Finally he states repeatedly that average values depend on general causes, and change only very slowly "by the secular progress of institutions and customs."

In the memoir of the second volume of the *Recherches statistiques* should be noted the fourth section, *Remarque générale sur le degré de précision des résultats moyens.*

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[1] Paris, 6 vols.; Fourier's essays are in the volumes for 1821 (2nd ed., 1833), 1823 (2nd ed., 1834), 1826 and 1829.

[2] Vol. i (1821), pp. ix-lxxiii.

The third introductory essay, *Mémoire sur les résultats moyens d'un grand nombre d' observations*,[1] presents formulas for finding the degree of precision[2] and the probable error of the average.[3] He presents a method of finding the quantity which when multiplied by three gives the positive and negative limits of error in a group of measurements,[4] and when multiplied by .47708 gives the probable error, which he calls the average error. These results are then generalized in the *Second mémoire sur les résultats moyens et sur les erreurs des mesures*,[5] treating by the use of the calculus the probable error of a result derived from any number of values each having its own probable error. Quetelet undoubtedly had early access to these volumes and was much stimulated by them.[6]

Thus the School of Political Arithmetic in contradistinction from the descriptive school, began by laying emphasis on the method of inquiry. Their central object of statistical investigation was the population, and, as more abundant data accumulated, they perfected both their conclusions and their technique. This is especially true of the development of mortality tables, which by the close of the eighteenth century had led to consider-

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[1] *Ibid.*, vol. iii (1826), pp. ix-xxxi.

[2] *Ibid.*, pp. xv, *et seq.* and p. xxv.

[3] *Ibid.*, pp. xviii, *et seq.*

[4] The probability is $\frac{19999}{20000}$ that the true result lies within A (average) + 3g and A − 3g.

[5] *Ibid.*, vol. iv (1829), pp. ix-xlviii.

[6] Thus Quetelet says in the preface to *Instructions populaires sur le calcul des probabilités* (Brussels, 1828), that he has made large borrowings from Laplace and that "lessons 12 and 13 are extracted in great part from the excellent introduction to *Recherches statistiques sur la ville de Paris*." He should have included also lesson 14, for it is clearly from the same source.

able insight into the nature of statistical data and the true method of treating them. Finally in the works of Laplace and Fourier we note decided indications of a tendency to give direct attention to the problem of technique and to extend the application of such technique to observations of natural and social phenomena. It was the function of Quetelet to gather up these various tendencies, to perfect the method, to extend the scope of its application and to give the whole a new and profound significance. His activity may be treated under the headings, (I) population statistics, (II) moral statistics, (III) development of technique and (IV) application of the normal law of error to the physical measurements of men.

(I) The studies in the statistics of population comprised in Quetelet's works[1] may be classed under three

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[1] The chief studies of population statistics are:

1. "Mémoire sur les lois des naissances et de la mortalité à Bruxelles," presented to the Brussels Academy, April 25, 1825, *Nouveaux mémoires de l'acad. roy. des sci. et bell.-let. de Bruxelles*, vol. iii (1826), pp. 493-512.
2. "Recherches sur la population, les naissances, les déces, les prisons, les dépôts de mendicité, etc., dans les Pays-Bas," presented to the Academy, February, 1827, *ibid.*, vol. iv (1827), pp. 115-165.
3. "Recherches statistiques sur le royaume des Pays-Bas," presented to the Academy, December, 1829, *ibid.*, vol. v (1829), pp. vi, 57 and tables.
4. *Recherches sur le reproduction et la mortalité et sur la population de la Belgique*. Publié avec M. Smits. Premier recueil officiel (Brussels, 1832).
5. *Sur l'homme et le développement de ses facultés, ou essai de physique sociale* (2 vols., Paris, 1835), book 1.
6. "De l'influence des saisons sur la mortalité aux différens âges dans la Belgique," *Nouv. mém.*, vol. xi (1838), 30 pp.
7. "Sur le recensement de la population de Bruxelles," *Bulletin de la commission centrale de statistique*, vol. i (1843), pp. 27-164.
8. "Nouvelles tables de mortalité pour la Belgique," *ibid.*, vol. iv (1851), pp. 1-22.

headings, (a) studies of births, deaths and marriages, (b) treatment of the law of population, and (c) development of tables of mortality and of population.

The study of births, deaths and marriages had been treated in a most thorough-going and extensive manner by Süssmilch in his second edition of the *Göttliche Ordnung* (1761 and 1762), but, since his time, there had accumulated a large quantity of material and there had been numerous more or less intensive researches on these subjects.[1] Among the most important of these were those by Quetelet's Parisian friends De Chateuneuf[2] Villermé and Fourier. The chief merit of Quetelet is in the comprehensiveness of his treatment of various phases of births and deaths. The best results of his memoirs preceding 1835, together with material gathered from many sources are found in the *Sur l' homme*.[3]

(*a*) Thus in the study of births he inquires into the effect of numerous natural and perturbative causes on both sex and fecundity; he inquires into the ratio of male to female births (1) throughout Europe, (2) in free and slave populations, (3) in town and country, (4) among legitimate and illegitimate births; he investigates the influence of age of parents and of conjugal condition

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9. "Nouvelles tables de population pour la Belgique," *ibid.*, pp. 71-92.

10. "Sur les tables de mortalité et de population," *ibid.*, vol. v (1853), pp. 1-24.

11. "Statistique internationale (population) par A. Quetelet et X. Heuschling," *ibid.*, vol. x (1866), CXV pp. of text and 406 pp. of tables.

Of these, numbers 3 and 10 might be classed as descriptive of official statistics.

[1] For list see references, *Sur l'homme*, bk. 1.

[2] Von John, *op. cit.*, p. 333 note, says that De Chateuneuf, at the instigation of his friend Poisson, devoted himself most zealously to statistics.

[3] *Sur l'homme*, bk. 1, chaps. i, ii and iii.

on the sex of offspring; he studies the influence of age of parents, of place, of years of abundance and scarcity, of years of peace and war, of seasons and of hours of the day, on the number of births. All the foregoing being classed as natural causes, he studies profession, economic condition, morality and political and religious institutions as perturbative causes. Similar correlations were made for still-births[1] and for deaths.[2] These studies contain few conclusions that were new at the time, but because of their clearness and comprehensiveness in both material and number of correlations, they afforded a striking and stimulating indication of the advancement of vital statistics and were an excellent medium for the spread of such knowledge.

(*b*) Quetelet's treatment of the law of population[3] does not deserve lengthy treatment. The distinguishing feature about it is the statement that the resistance to the growth of population increases, all other things being equal, as the square of the rate at which population tends to increase. He presents neither data nor course of reasoning to support this conclusion nor does he explain any of the possibilities lurking in the phrase "all other things being equal." The theorem therefore is certainly not demonstrated.

(*c*) Quetelet's first statistical memoir,[4] giving a table of mortality with a distinction of sex, sought to provide a reliable basis for life insurance in Brussels. A second memoir[5] extended the tables of mortality and of popula-

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[1] *Nouv. mém.*, vol. iv (1827); *Sur l'homme*, bk. 1, chap. iv.

[2] *Ibid.*, bk. 1, chap. iv. [3] *Ibid.*, bk. 2, chap. vii.

[4] *Nouv. mém.*, vol. iii (1826), pp. 493-512.

[5] *Nouv. mém.*, vol. iv (1827).

tion to the southern provinces, while studies of 1832[1] and 1833[2] gave tables for all Belgium. Quetelet early made the distinction of sex and of residence in city or country; he also brought out the varying rates of mortality at different ages, as in the early months of childhood, at the ages preceding puberty, and at the ages twenty-four and thirty, in men. He perfected these tables on the basis of the registers of death for the five years 1841–5.[3] The chief importance of these tables lies in their great practical value in his own country. His first serious attempt at the treatment of the mathematical theory of tables of mortality and of population was in the memoirs of 1851 and 1853.[4] This last memoir is in three sections, the first two of which treat these tables for a stationary population following very closely Fourier's method. He however makes the evident error of confusing the population at the end of a calendar year with that at the end of a year of life. The third section treats the subject for any population whatever. He however assumes that the births of a calendar year occur simultaneously and that all the generations represented in a population at a given time have the same rate of mortality whether the population be increasing or decreasing. Neither of these assumptions being true he fails to reach a general formula. Nevertheless his studies were not without value to the general progress of the theory.[5]

[1] *Recherches sur la reproductiou et la mortalité de l'homme aux différens âges* (Brussels, 1832).

[2] *Sur l'influence des saisons et des âges sur la mortalité*, presented to the Academy of Moral and Political Sciences of the Institute of France in 1833, reproduced in *Sur l'homme*, bk. 1, chap. 5, sec. 5, and elaborated in *Nouv. mém.*, vol. xi (1838).

[3] *Bull. de la cent. com. de sta.*, vol. iv (1851), pp. 1–22.

[4] *Ibid.*, pp. 71–92, and vol. v (1853), pp. 1–24.

[5] See Knapp, *Theorie des Bevölkerungs-wechsels*, pt. 2, p. 93, *et seq.*; Block, *Traité de statistique*, p. 206, *et seq.*

(II) In 1826 appeared the first of the *Comptes généraux de l' administration de la justice criminelle en France.* In these annual reports were enumerated the number and kind of crimes and misdemeanors, as well as the sex, age, occupation and education of the accused. Quetelet uses these reports in his "Recherches statistiques sur le royaume des Pays-Bas."[1] In this he compares the sexes as to the kind of crimes, presents the relative number of crimes committed against persons and against property at each age, and tentatively sets forth the relative degree of tendency to crime at each age.[2] Comparing the figures for the three years, 1825–1827, he emphasizes the "astounding exactitude with which crimes are reproduced."[3] He adds,

> Thus we pass from one year to another with the sad perspective of seeing the same crimes reproduced in the same order and calling down the same punishments in the same proportions. Sad condition of humanity! The part of prisons, of irons and of the scaffold seems fixed for it as much as the revenue of the state. We might enumerate in advance how many individuals will stain their hands in the blood of their fellows, how many will be forgers, how many will be poisoners, almost as we can enumerate in advance the births and deaths that should occur.[4]

The same year, 1829, A. M. Guerry brought out his *Statistique comparé de l' état de l' instruction et du*

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[1] *Nouv. mém.*, vol. v (1829), pp. 25–38; read to the Brussels Academy December 6, 1828.

[2] *Ibid.*, p. 33.

[3] *Ibid.*, p. 35.

[4] *Nouv. mém.*, vol. v, pp. 35 and 36. This quotation shows that Quetelet had reached, in 1828, practically the same position as in the "Recherches sur le penchant au crime aux différens âges" of 1831, which is usually treated as his first work in moral statistics. There is thus good ground for giving to Quetelet priority in this field, instead of to Guerry as is usually done.

nombre des crimes[1] in which was sought an estimate of the moral level of France by the use of statistical data. So also, he and D'Ivernois endeavored to compare the moral level of different countries by comparing their criminal records. Quetelet had made such a comparison between France and the Low Countries in his "Recherches" of 1829,[2] but Guerry and D'Ivernois saw no especial significance in the constancy of the numbers from year to year, while it was precisely this that Quetelet emphasized.[3] This constancy of the budget of crimes was strikingly brought out in his "Sur le penchant au crime aux différens âges."[4] Regularity in the number of suicides was noted in the *Sur l'homme*, and the constancy in the number of marriages for each age and sex, first shown in this same work, became the principal object of his later studies in moral statistics.

Thus it was that, though Guerry coined the term "moral statistics," Quetelet gave it significance. He did this in the following ways:

(*a*) He emphasized the relation of the statistical regularities to man's moral freedom. The regularities which Arbuthnot,[5] Derham and Süssmilch had found to be the surest evidence of a divine order maintained for the good of man, Quetelet elevated to the

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[1] Paris, 1829.

[2] *Nouv. mém.*, vol. v, p. 27, *et seq.*

[3] Jealousy seems to have existed between Quetelet and Guerry. The former, however, relented and in 1847 used Guerry's term "statistique morale," but the latter remained unfriendly to the last. See especially "Note" following "Recherches sur le penchant au crime" and note in *Sur l'homme*, English translation, p. 96, near the end of book third.

[4] *Nouv. mém.*, vol. vii (1831), 81 pp.

[5] "An argument for Divine Providence, taken from the constant Regularity observed in the Births of both sexes," Phil. Tr., vol. xxvii.

rank of social laws, comparable to the laws of physics. He gave a scientific, rather than a theological interpretation of the facts and thus threw doubt on man's free will. "It seems to me that what relates to the human species, considered *en masse*, is of the order of physical facts."[1] The possibility of predicting in advance the number and kind of crimes weighed heavily, at times, upon Quetelet's humanitarian spirit. "This possibility . . . . must give rise to serious reflections, since it concerns the fate of several thousand men who are driven, as it were, in an irresistible manner toward the tribunals and toward the condemnations that await them."[2] The picturesqueness of his language and the clearness with which he joined the issue, compelled attention and led to wide discussion of the true nature of statistical regularities and their ethical implications.

(*b*) At the same time that Quetelet held his averages to be "of the order of physical facts," he held them to be dependent on social conditions and therefore to vary with time and place. This made possible the study of causal relations in social phenomena, for a change in social conditions would be followed by a change in the averages. Thus, social conditions were made responsible for the criminal budget and moral statistics was directly connected with social science. The problem then became that of expressly connecting social evils with certain social conditions, and by changing the latter also change the former.

(*c*) But this study of casual relations requires much more critical methods of treatment than a purely descriptive problem. The basic principles of the method presented by Quetelet for this study were derived from the

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[1] *Nouv. mém.*, vol. vii, p. 80.

[2] *Ibid.*, p. 23.

theory of probabilities. They were: (α) effects have causes and are proportioned to them, and (β) reliable conclusions can be deduced from large numbers only. These principles are strikingly like those recognized by Süssmilch,[1] but no doubt they reached Quetelet by way of French mathematicians and astronomers, rather than directly or indirectly from the German theologian and statistician. From the first of these he derived the principle that man's moral and intellectual nature would be shown in his actions, and that the true nature of a social state would be shown in its products. But the effects of fortuitous circumstances can be avoided, and the results of general conditions can be seized, only by considering large groups of homogeneous data.

(III) These principles formed a part of his general development of the methods of statistical inquiry. The essential features of this are to be noted later,[2] hence it will suffice here to say that, although most of the principles utilized by Quetelet in the development of the normal law of error and its use in statistical inquiry had been already developed by the students of probabilities and in the essays of Fourier, yet it was doubtless the writings of Quetelet that led to their general appreciation and adoption. This was due to the clearness with which he stated the results of mathematical analysis and to the wide public which his writings reached. It may be emphasized here, moreover, that it was largely through Quetelet's application of the same statistical method to anthropology, meteorology, astronomy, medicine and social science that arose the conception of statistics as a widely applicable method of observation.

(IV) But there is one feature of the application of this

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[1] See pp. 47-48, *supra*.

[2] Chapters iv and v.

normal law of error which is distinctly his own, and which has been of especial significance both for the further perfection of statistical method and for the development of biological science. He likened society to a body having as its center of gravity the average man.[1] The determination of the properties of this average man would, he thought, give a true picture of the general features of the social body. These ideas were first presented in "Recherches sur la loi de croissance aux différens âges," [2] in which was presented the average height of groups of individuals of each age from birth to maturity. It was not, however, until much later that the idea of the average man as a type about which all men of the same class were grouped in accordance with a definite law was expressly developed.[3] The average man as a type varies with time and place.[4] Similar concepts were readily applicable to any plant or animal. What was true of the distribution of the heights of men might prove to be true of any characteristic of a plant or animal; and what was true of the average man might prove to be true of the type of a species. Hence the possibility of studying the subject of biological variation by means of exact numerical measurements.

The preceding survey of Quetelet's statistical activity shows both its broadly inclusive character and its epochal importance in the history of the science. It is with good reason that Von John declares that "Quetelet's masterpiece of 1835 . . . is in fact a landmark in the historical

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[1] See chap. iii, *infra*.

[2] *Nouv. mém.*, vol. vii (1831), 31 pp.

[3] See chap. iii, *infra*.

[4] Quetelet was not consistent on this point of the variability of the average man.

development, not only of political arithmetic, but also of the German university statistics."[1] Among the causes of this eminent position must be included (1) the abundance of new data; (2) Quetelet's close contact with the French scholars interested in the theory of probabilities and in statistics; and (3) the wide publication of his results.

The abundance of new data was of primary importance. It made possible the comprehensive treatment[2] of vital statistics, including a practical table of mortality for Belgium, and it raised questions of criticism of sources and of method of treatment. Official documents being a chief source, Quetelet exerted upon them a far-reaching influence both through his own writings and the movement for international comparability represented by the Statistical Congresses. He was, in this way, largely instrumental in bringing such documents to a character mid-way between the purely verbal Achenwall-statistics and the purely numerical table statistics, by including with the tabular results descriptive and explanatory material. He extended the scope of statistical inquiry by adding the new field of moral statistics. It was mainly by this addition and the results following thereupon that the term first used to designate a new discipline in the German universities came to have that scientific character sought by the school of political arithmetic. Emphasizing the connection between social conditions and statistical results, he made the fundamental aim of the science of statistics the study of the co-existence and sequence of social phenomena in correlation with the environing conditions of social life.

But he not only gave meaning to statistics as a descrip-

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[1] *Geschichte*, p. 370.

[2] *Sur l'homme*, bk. i.

tive science, he also developed the conception of statistics as a method of scientific investigation serving all the sciences of observation. The law of error, developed by astronomers, and the theory of probability, cultivated zealously by that group of bright men centering around the great Laplace, found in the writings of Quetelet both simplification and elaboration and a channel of communication to an extensive group of readers. Moreover, this method found a new, and, to-day, highly significant extension in his studies of physical anthropology.

Finally should be emphasized the fact that practically everything of importance that Quetelet hit upon, he published time and again. The *Correspondance mathématique et physique*, the *Nouveaux mémoires*, the *Bulletins*, and the *Annuaire* of the Brussels Academy, the *Annuaire* of the Observatory, and the *Bulletin de la commission centrale de statistique*, as well as his numerous works, furnished a varied means of communication with an extensive public. If further means were needed they would be found in his voluminous correspondence and in his connection with learned societies throughout the world.

Quetelet thus gathered up the chief statistical tendencies of his time, and contributed, in more or less notable degree, to the advancement of each. His genius consisted not so much in original conceptions as in a keen appreciation of the importance of various ideas and the great practical sense with which he applied them.

CHAPTER III

THE AVERAGE MAN

Quetelet's name is customarily associated with the term average man (*homme moyen*) and with considerations on the importance of this *homme moyen* for a statistical study of society. The ideas involved in the concept, average man, are central in all of Quetelet's researches and are critical for an understanding of his writings. Apart from the unity derived from the more or less general presence of the notion of the average man, his writings on population and moral statistics, physical anthropology, statistical methods and the social system are completely lacking in a unifying principle. G. F. Knapp holds that there was no continuous unfolding of Quetelet's chief ideas.[1]

No doubt the germ of all he has to say is found in the writings preceding the *Sur l'homme* of 1835, but Quetelet himself has indicated the natural development of his central thoughts. He says in the preface of *Du Système social* that in his first work, *Sur l' homme*, he presented the idea of the average man as the mean between two limits; that in the *Letters* he showed that the average man as to height is a type about which the heights of other men are grouped according to the law of acci-

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[1] "Bericht über die Schriften Quetelets zur Socialstatistik und Anthropologie." Hildebrand's *Jahrbücher für Nationalökonomie und Statistik*, vol. xvii, p. 358.

dental causes. "In this new work I show that the law of accidental causes is a general law which is applied to individuals as well as to peoples and which dominates our moral and intellectual qualities as well as our physical qualities."[1] There was thus, after 1835, development in the concept of the average man and an extension of its application as a means of interpreting social phenomena.

A brief survey of this development and extension will serve to bring out the nature of this concept in its final form. The first researches on the qualities of the average man dealt with the physical qualities of height and weight, which are susceptible of direct measurement. In the memoir "Recherches sur la loi de croissance de l'homme"[2] he says,

> The man that I consider here is analogous to the center of gravity in bodies; he is the mean about which oscillate the social elements; he is, so to speak, a fictitious being for whom all things proceed conformably to the average results obtained for society. If we wish to establish the basis of a social mechanics (*mécanique sociale*), it is he whom we should consider, without stopping to examine particular or anomalous cases.

Thus the normal law of growth expressed in tabular form for each sex gives the average heights of male and female Belgians, at each age, from five months preceding birth to maturity, at about the ages of twenty-five and twenty years, respectively. These tables do not show the heights any particular individuals will attain at given ages, any more than a mortality table would give the time of death of particular persons, but they give

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[1] *Du Système social et des lois qui le régissent* (Paris, 1848), p. ix.

[2] *Nouv. mém.*, vol. vii.

rather the height of the *average man* at each age. The normal law of growth thus shown applies to the whole group of Belgians of either sex, viewed as an aggregate. It is the law of growth for the average man, the heights given being those about which the heights of all persons of given age and sex "oscillate." Just how this oscillation takes place Quetelet does not at this time state. He did state however that studies similar to this on the law of growth in height should be made for man's various physical, intellectual and moral qualities.

In the memoir "Recherches sur le penchant au crime aux différens âges,"[1] he uses the term average man (*homme moyen*) for the first time. "If the average man were determined for a nation he would present the type of that nation; if he could be determined from the ensemble of men, he would present the type of the entire human species." He here studies the possibility and the means of determining the average man and hints at the average man as the type of the beautiful.

The next memoir[2] studies the relation of height to weight at each age, but it adds nothing to the general notion of the average man. The *Sur l'homme* gives, besides a reproduction of the preceding studies, much general discussion of the average man[3] but adds little to the precision of the concept. But in the article "Sur l'appréciation des documents statistiques et en particulier sur l'appréciation des moyennes"[4] is developed carefully the view of the average man as a *type*. Here, for the

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[1] *Nouv. mém.*, vol. vii, p. 1 of the memoir.

[2] Recherches sur le poids de l'homme aux différens âges, *Nouv. mém.*, vol. vii.

[3] Especially bk. iv.

[4] *Bulletin de la com. cent. de stat.*, vol. ii (1845), pp. 205–287.

first time, he gives exact connotation to the word type and shows just how the members of a group oscillate about the average. Even in the first memoir[1] certain of the tables showed symmetrical distribution about the average, but Quetelet did not comment on the symmetry. But in this later article this distribution is his theme.

Having established his scale of possibility, he begins an examination of the manner in which the numbers from which an average are deduced are grouped about it.[2] He first distributes 8192 measurements of the height of the same person about the average, seven groups above and seven below, according to his scale. This leads to the question

> whether there exists in a people a type-man, a man who represents this people as to height and in relation to whom all the other men of the same nation might be considered as presenting variations more or less great. The numbers we would obtain in measuring these latter would be grouped about the average in the same manner as those which we would obtain if the same type-man were measured a great many times with means more or less clumsy.[3]

A study then of the distribution of the chest measurements of 5738 Scotch soldiers and of the heights of 100,000 French conscripts shows a close agreement between the actual distribution and that calculated according to his scale. In fact he believes that in the latter case he is able to prove fraud by the lack of continuity in the actual distribution: a congestion below the required height and a scarcity just above it indicate that some 2000 have escaped service by reducing their height

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[1] "Recherches sur la loi de croissance de l'homme."

[2] "Sur l'appréciation, *etc*," p. 250.

[3] *Ibid.*, p. 258.

two or three centimeters. Thus he finds not only confirmation but a practical use of the conception that there is a type-man from which all men are but variations.

In the *Letters*[1] the matter is further elucidated with much of the same data. If one should make 1000 measurements of the chest of the Gladiator, or of a living person, or if 1000 sculptors, working without preconceived notions, should copy the Gladiator and their copies should be measured, each set of measurements would be grouped in accordance with the law of possibility. If we assume that one would likely as not make an error of one inch in measuring the chest of a living person, then the chest measurements of the 5738 Scotch soldiers are grouped with as much regularity as would be the same number of measurements made on one individual. "The measurements occur as though the chests measured had been modelled from the same type. If such were not the case the measurements would not, in spite of their imperfections, group themselves with the astonishing symmetry which the law of possibility assigns them."[2] To the objection that the Scotch soldiers represent a selected group, Quetelet replied that the accurate verification of the principle is more easy when all the men of a nation are taken; the only effect of embracing a larger number is to widen the limits of variation.[3]

In similar manner Quetelet then treats the heights of 100,000 French conscripts. The probable error in this case, however, is two inches, and his argument for the existence of a type rests on the condition that a very

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[1] *Letters on the Theory of Probabilities*, trans. by Downes (London, 1849), pp. 90-105.

[2] *Ibid.*, p. 93.

[3] *Ibid.*, p. 94.

unskillful person with crude instruments would be liable to an error of two inches in measuring a conscript of the average height.

> Everything occurs then as though there existed a type of man from whom all other men differ more or less. . . . Every people presents its mean and the different variations from this mean in numbers which may be calculated *à priori*. This mean varies among different peoples and sometimes even within the limits of the same country, where two peoples of different origins may be mixed together.[1]

Thus was presented the definite concept of the average man as a biological type, about which the actual men of a given group were distributed according to the normal law of error, or the *law of accidental causes* as Quetelet called it. This type was always spoken of as due to constant causes and the variations from it as due to accidental causes. The next step was to generalize this concept by extending it to all of man's physical properties and to his intellectual and moral qualities, whether with reference to the normal state of an individual, or to the average man of a nation or of humanity considered at a definite period of time, or through all the vicissitudes of national and human history.

This generalization is the theme of the *Système social.* This work is divided into three books devoted respectively to man, societies and humanity. The first two books are divided into three sections each, treating respectively the physical, moral and intellectual qualities, while the third considers in a general way the effect of progress in knowledge on these various qualities, their relations to each other and the limits through which they

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[1] *Letters*, p. 96.

vary. Probably most of the points made in this work had been previously noted by Quetelet, but here they are grouped systematically. The aim is to show the universal validity of the law of accidental causes. "There is a general law which dominates our universe . . . ; it gives to everything that breathes an infinite variety."[1] "Among organized beings all elements vary about an average state, and these variations, due to accidental causes, occur with such harmony and precision that we can, in advance, classify them by number and extent."[2]

Thus the average man, at first somewhat vaguely conceived as a mean between limits more or less extended, was at length definitely conceived as a type. His delineation was based on a law derived from the mathematical theory of chances but believed to have the widest possible realization in the phenomena of organic nature. The average man, according to Quetelet, will show the effects of the operation of "constant" causes, while the variations about him will show the effects of "perturbative" or "accidental" causes. Thus we have here not only a manner of viewing living things, but a criterion for distinguishing that which is typical and general, from that which is only individual.

In the determination of the properties of the average man, Quetelet carried on many extensive researches. This was in fact the particular aim of most all of his statistical studies. From the data of population statistics he sought to discover the conditions attending the birth of the average man, and the time and conditions of his death. The law of growth showed the height of the average man at each age.[3] This was followed by a mul-

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[1] *Du Système social*, p. 16.

[2] *Ibid.*, p. 17.

[3] "Recherches sur la loi de croissance de l'homme."

titude of studies of men's physical proportions at each age culminating in the *Anthropométrie* of 1871. Similar studies in the development of mental and moral traits were those dealing with the products of dramatic talent[1] and with the propensity to crime.[2] Still other moral qualities of the average man were sought in the study of foresight, of suicides[3] and of marriages.[4] All of these studies have great historical significance. Those in the physical proportions of men were the precursors of the physical measurements of criminals as a means of identification, and of the measurement of head forms and other bodily parts by physical anthropologists as a means of racial discrimination. Especially were they the antecedents of the studies in biological variation which bid fair to make of biology a relatively exact science. Quetelet's studies of mental trials were the forerunners of studies in experimental psychology, which seem destined to lay the foundation for a science of education. Finally the studies in moral statistics opened the way for the inductive study of social life.

Quetelet presented a most important and extensive rôle for the average man.[5] Many scientists, so Quetelet thought, would find his properties of the highest usefulness. The physician could thus determine the most useful remedies and the action to be taken, both in the usual case and in the unusual, by comparing his patient with the fictitious average. The artist and man of letters

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[1] *Sur l'homme*, bk. iii, chap. i.

[2] Especially "Recherches sur le penchant au crime aux différens âges." *Nouv. mém.*, vol. vii.

[3] *Sur l'homme*, bk. iii, chap. ii.

[4] Especially "Statistique morale," *Bulletin de la com. cent. de stat.*, vol. iii, and "Sur la statistique morale," *Nouv. mém.*, vol. xxi.

[5] *Sur l'homme*, bk. iv.

could thus present a most truly representative art and literature. The politician could thus more accurately play upon the general sentiments and beliefs in the formation of public opinion. The naturalist by the use of the average man could fix racial characteristics and demarcations, and determine the extent of any changes in racial types from time to time. Finally the social scientist, by determining the average man for various nations, from year to year, throughout the course of national history, would be able to ascertain for nations as well as individuals, their laws of birth, growth and decay, of equilibrium and motion,—the course followed, so to speak, by their centers of gravity.

There is something fascinating in this conception of the average man, while the task of its complete realization is stupendous. It is a statistical conception of the universe possessing qualities of poetic and artistic beauty. Everything is to be viewed as varying about a normal state in a manner to be accurately described by beautiful bell-shaped curves of perfect symmetry but of varying amplitude. Thus it is that the individual varies about his normal self; thus members of a group vary about their average; thus the men of a nation, viewed as individuals, vary about the average man of the nation; thus a nation varies about its normal state; and finally, inasmuch as the qualities of the average man change from time to time and place to place in obedience to general causes, to follow the course of the average man in the whole series of nations would give us, in Quetelet's view, the principles of a social physics, the true mechanics of human history.

One of the early objections made to the conception of the average man was that he could not be constructed as a composite being; that the attempt to put together

numerous average qualities would result in a monstrosity. Cournot argued that the averages of the bodily proportions of a group of men would not be consistent with one another or with the conditions of viability.[1]

Such objections have often been repeated. But such controversy comes to naught. Quetelet himself called the average man a "fictitious being" in his first use of the term.[2] It would seem then pertinent to remark that the conditions of viability for a fictitious being, or the general harmony of his parts, can have only a speculative interest and value. The result obtained by dividing the sum of a series of measurements by their number is merely a numerical average and becomes the quality of an average man only by a flight of constructive imagination. The average height of a group is readily transposed into the height of the average man of that group, but no practical utility is gained by such transposition. It may also be stated that the essential thing is adequately to represent the group, and, for this purpose, the average alone is not sufficient. Significant changes may occur in

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[1] Cournot reasoned by analogy. He stated that the averages of the sides of a series of right triangles do not give a right triangle; nor are the sides, angles and areas of a series of any kind of triangles so consistent with each other as to form a triangle. In like manner average bodily proportions will not fit together so as to make life possible. See *Exposition de la théorie des chances et des probabilités* (Paris, 1843), pp. 213-214. Quetelet replied to this in *Du Système social*, p. 35, *et seq.* He divided a group of thirty men into three sections in such a way that the average heights of all three were the same. He then found that other average measurements for the three sections were nearly the same. He believed this experiment proved Cournot's criticism invalid. Now while Cournot's reasoning by analogy is not convincing, Quetelet's experiment does not meet the issue. It proves only that the averages of the same trait of several homogeneous groups are nearly equal, not that the averages of several different traits are mutually harmonious.

[2] See p. 63, *supra*.

measurement of many products of nature's art. Hence the average found fairly represents the perfect in physical proportions for the time being.

Just how Quetelet reached the conclusion that the average man represents perfection in mental and moral traits is not equally clear. It seems however to have been reached through manipulation of the phrase "free from excess and defect." This phrase he frequently applied to the average, the excesses and defects being the effects of accidental causes. An excess or defect properly denotes quantitatively more or less of a trait than the average. But the average, as shown in the preceding paragraph, having become in many studies the type of the perfect, an excess or defect readily came to designate too much or too little of a trait, and thus acquired qualitative significance. What he meant by an excess of mental ability or morality or health Quetelet nowhere clearly states. Nevertheless it seems reasonably clear that, in his use of the terms, an "excess" was no better qualitatively than a "defect." Thus he could use the phrase in the most general manner, and, disregarding statistical possibilities, speak of a fictitious average man, having a group of perfectly harmonious qualities, "free from every excess or defect" and hence the type of perfection of his time.[1]

It is useless here to discuss what may or may not constitute a standard of perfection. Such standards are prone to vary with individual ideals and with the uses to which the qualities considered are to be put. But the following considerations may be brought to bear upon

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[1] *Sur l'homme*, bk. iv, chap. i, § 3; English translation of same, special preface, p. x; *Du Système social*, p. 28, *et seq.*; *Physique sociale*, p. 391, *et seq.*

Quetelet's position as presented in the two preceding paragraphs. (1) With reference to physical proportions the average may be made a standard of beauty by preliminary definition. (2) If, however, we take Quetelet's objective standard, namely, the type which nature is striving to produce, the average is not the standard of perfection. For, contrary to Quetelet's supposition, the biological type is changing, with the result that nature must be represented as striving to produce not the average height, for example, but a height somewhat above or below the average—a height more favorable to survival and, in this respect also, more perfect. With respect to the average of mental and moral traits as the type of perfection it may be stated, (1) that here, as well as in physical traits, the average gives a tolerably perfect type of the group but by no means the most perfect in the group; (2) that Quetelet seems to have juggled with the phrase "free from excess and defect," using it in two senses; and (3) that average ability or average power in any mental trait is in no danger of being confused with superior grades of ability or power. If it be contended that the perfection of Quetelet's average man consisted largely in the harmony and balance of mental and moral qualities it could be replied not only that the concept of the average man as a composite being having been abandoned as of doubtful utility this contention becomes futile, but also that a man combining only average qualities would be a mediocre person, without intellectual vigor or moral flavor. It might be stated also that theoretically the combination of causes provides that a large group may include one or more individuals possessed of superior grades of abilities, whether physical or mental, all as well-proportioned as in the average of the group.

studies was that in which certain kinds of social events, as suicides or marriages, occuring in a group viewed collectively, were counted and the average number for a series of years was found. The result was a so-called statistical regularity, indicating the probable number of similar events that would occur in the same group during the succeeding year. Very similar to these were the studies in which Quetelet distributed the number of certain moral acts, as crimes, according to the ages of the persons committing them. He then divided the number of acts by the total number of persons in the respective age groups. The results showed the respective probabilities of committing crime at various ages. These probabilities Quetelet called the "propensity to crime" (*penchant au crime*).[1] If these distinctions be sound, it should be evident that the so-called "propensities" to crime, to marry, to commit suicide, as Quetelet found them, are not characteristics of the average man of the group. The average man may have a certain inclination to commit crime, but it is not ascertainable from a study of the criminal registers. The persons committing crime are, with respect to the group average, all on one

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tribution with reference to the tendency to marry, and, on page 14 of the same essay, he presents a curve to illustrate the distribution of a population with reference to the propensity to crime, or the probability of committing crime. The actual distribution, however, is not made. Moreover the accompanying discussion shows that his curve actually represents the comparative probability of committing crime at each age. It does not represent the distribution about the average propensity or probability.

[1] In the "Recherches sur le penchant au crime aux différens âges," *Nouv. mém.*, vol. vii, p. 17, Quetelet defines the *penchant au crime* as the greater or less probability of committing crime. Moreover in *Du Système social* he suggests as a substitute for the word *penchant* the word *possibilité*.

end of the curve of distribution, the other end of the curve representing those persons who have an abhorrence of crime, or a propensity to conformity to law. Owing therefore to the prominence given by Quetelet to the concept average man, even in the "Recherches sur le penchant au crime aux différens âges," he may be criticised for not indicating just when he did and when he did not ascertain a quality of this fictitious being.

But far more important than the foregoing was Quetelet's conception of the average man as a biological type. His argument here was very similar to that already presented with regard to the average man as the type of physical beauty.[1] It rested on the analogy between the distribution about the average and the distribution of the accidental errors. As already shown,[2] Quetelet found in the symmetrical distribution about the average evidence that the average was a type which nature was seeking to produce. Chest measurements of Scotch soldiers and heights of French conscripts were distributed in the same way that the same number of measurements on one person would be distributed, on the assumption that one would in the latter case likely as not make errors equal to the probable errors of the measurements of chests or heights. Thus, the men of a nation were grouped about their average "as if they were the results of measurements made *on one and the same person*, but with instruments clumsy enough to justify the size of the variations."[3]

Quetelet's analogy between the efforts of nature in producing a type and of man in measuring a height of a person was in appearance considerably weakened by the

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[1] Pp. 72–73 *supra*.

[2] Pp. 65–67 *supra*.

[3] *Du Système social*, p. 18.

fact that an error of three feet eleven inches in measuring a height of five feet four inches is extremely improbable.[1] But Quetelet's comparison may be viewed as an illustration of how the distribution of biological measurements in nature may be expected to occur, not as a proof of nature's intentions. Moreover, as Professor Venn has pointed out[2] the "ideal" series of chance must be distinguished both from the series obtained by measuring a group of homogeneous things and from that secured by many measurements of the same thing. The first of these is arrived at deductively, expressed by the binomial law and remains ever the same; the others are arrived at inductively and vary with conditions. In the case of the third alone does the limit represent a real thing which may be approached indefinitely by multiplying the number of measurements. The type in this case is real and fixed. But in the second case the type is fictitious, and in living things is changing, with the result that measurements continued through a long period of time do not give an indefinite approach to the type.

Quetelet was by no means clear and consistent as to the permanence of the type. He usually spoke of the average man as varying from country to country, as not being the same for urban and for rural populations, as, in fact, being different in different environmental and social conditions.[3] In other words, "the average man is always such as is comformable to and necessitated by time and place."[4] In direct contradiction to these ideas

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[1] He found the average height of Frenchmen to be five feet four inches, and the extremes, seventeen inches and nine feet three inches.

[2] *Logic of Chance* (3rd ed., London, 1888), p. 26. *et seq.*

[3] *Letters*, p. 96; *Du Système social,* p. 14, *et seq.*

[4] *Sur l'homme,* bk. iv, chap. i, § 3; or, *Physique sociale*, vol. ii, p. 391.

he stated as his belief that the average physical properties of man have not varied from the earliest times.[1] He held that plants and animals, subject to the immutable laws of nature, have ever "an unalterable type." "The tree type has remained the same" for the olive since the days of Codrus; even to the size and number of leaves it has not changed.[2] Among plants and animals not only has the average, according to Quetelet, remained the same, but the limits through which variations occur have likewise remained unchanged.[3] He then introduces still greater confusion by the apparently contradictory statement that man has been able not only to raise his averages but also to restrict the limits of variation, through the acquisitions of science.[4]

It seems impossible to reconcile these various propositions. It is clear from the examples he gives that the last statement does not imply in any way a conscious application of laws of inheritance and biological selection, but merely the effect of the advance of such sciences as optics and surgery in reducing physical defects, and the effect of the spread of knowledge in reducing illiteracy and in raising the average intelligence. As regards changes in the human type, therefore, either in the type itself or the limits of variation about it, the acquisitions of science which Quetelet had in mind, are in all probability ineffective, their effectiveness being dependent upon the extremely doubtful tenet that acquired characteristics are inherited. A partial reconciliation of the other statements of Quetelet regarding the perma-

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[1] *Du Système social*, pp. 252 and 257; *Physique sociale*, vol. ii, p. 392.

[2] *Du Système social*, pp. 252 and 257, *et seq.*

[3] *Ibid.*

[4] *Ibid.*, p. 259; see also *Sur l'homme*, bk. iv, chap. i, § 3, or *Physique sociale*, vol. ii, p. 396.

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[1] *Du Système social*, pp. 252 and 257; *Physique sociale*, vol. ii, p. 392.

[2] *Du Système social*, pp. 252 and 257, *et seq.* [3] *Ibid.*

[4] *Ibid.*, p. 259; see also *Sur l'homme*, bk. iv, chap. i, § 3, or *Physique sociale*, vol. ii, p. 396.

nence of the type may be found in his division of causes into natural and perturbative. He says,

> The average height of man is an element which has nothing accidental about it; it is the product of fixed causes which assign to it a determined value.[1] . . . Professions, wealth, climate may cause the development of height among different peoples to vary. Nature and man work together to produce these modifications. I have distinguished these two kinds of action by the names of *natural* and *perturbative* forces. The first have a character of fixity and permanence which does not pertain to the second. The latter work as do accidental causes.[2]

Thus, assuming unchanging physical conditions, an unchanging average height would result, while different groups within the same physical environment, selected on the basis of occupations, for example, might have different average heights. So much may be said by way of reconciliation, keeping in mind the analogy of drawing balls from a bowl which served Quetelet as an epitome of nature.

But even this falls short of being satisfactory. If "perturbative" cause act as do accidental causes, then they should not be linked with "natural" causes to explain the difference in the average height of two peoples. If man's action is only "perturbative," and therefore accidental, it could not change the average. But it is interesting to note how very close Quetelet came to the discovery of the selective action of environment. He was only one step from it in his proposition that the average conforms to the necessities of time and place. This statement strongly suggests modification through

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[1] *Du Système social*, p. 17.

[2] *Ibid.*, p. 21, *et seq.*

change of environment and adjustment to environment. But Quetelet posits unchanged physical conditions throughout recent geologic time[1] and apparently overlooks the possibility of the migration of a species from one environment to another.

There are other passages in Quetelet which likewise suggest a selective process in nature. These are the passages dealing with asymmetrical distribution, or cases "when the chances are unequal." He found an exception to the general rule of symmetry in the distribution of weights. His limits here were 19 livres and 649 livres, with an average of 140 livres. These limits differ from the average in the ratio of one to four.[2] But Quetelet passes over this exception to his general rule by insisting that the distribution is continuous and that the numbers of individuals above and below the average are the same. In the *Letters*[3] he finds similar sets of observations in the daily fluctuations of temperature in winter, changes in the prices of grain, variation in the mortality rate, and the ratio of the sexes at birth, while barometric pressures extend farther below than above the average. He concludes that "Nature is like man in this—when it differs from its type, it is more often in exaggeration than in diminution."[4] This is evidence, he says, that the causes tending to produce variation in one direction are stronger or more numerous than those operating in the opposite direction. His illustrative explanation of the condition in nature which the unsymmetrical curve represents is based on the distribution of chances in drawing balls from a bowl in which the white and black balls are not equal but in the ratio of three to

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[1] *Du Système social*, p. 257.

[2] *Ibid.*, pp. 44-45.

[3] "Letters xxv and xxvi."

[4] *Du Système social*, p. 113.

two.[1] But Quetelet undoubtedly thought of the ratio in nature as "determined and immutable."[2] Thus, though he used many expressions suggestive of evolutionary change of the type, he did not grasp the notion of such change.[3] Though he developed and used the method which has come to serve in the work of Galton, Pearson and others as the basis for the mathematical demonstration of evolutionary development, he did not himself make any such use of it.

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[1] *Du Système social*, p. 118, *et seq.*

[2] *Ibid.*, p. 118.

[3] This does not overlook those passages in which he speaks of the progressive development of man's intellectual faculties. In these he refers not to any biological change, but only to the increase in man's command over nature through the growth of scientific knowledge.

CHAPTER IV

MORAL STATISTICS

It has already been stated that Quetelet's studies in moral statistics opened a new field to statistical research, the sphere of human actions, where all is apparently indeterminate and individual. His venture into this field created very wide discussion, especially in Germany, furnished a statistical basis for some of the generalizations in the early pages of Buckle's *History of Civilization in England*, and was significant in the development of the methods, concepts and scope of statistics. The purpose of this chapter is to survey the principles and methods of moral statistics as Quetelet presented them.

By moral statistics is meant that portion of the general science dealing with such individual actions as are commonly classed as moral or immoral. The phenomena usually dealt with are crimes, suicides and marriages. These actions have the characteristics of occurring more or less frequently in a social group, of giving opportunity for the exercise of individual discretion, judgment, will, and of being correlated quite directly with social conditions. Any similar acts would supply data for moral statistics. The first aim is to establish the norms for various kinds of moral actions, that is, the average number that occur under given conditions during a period of time. These norms form the statistical regularities, for it is found that in a series of years the numbers of crimes, suicides or marriages vary about

their average, showing a tendency for the average number to be repeated from year to year. These regularities are often called statistical or sociological laws. Moral statistics then attempts to correlate the phenomena under investigation with certain physical and social conditions, by showing variations in the numbers as the conditions are changed. To do these things it follows certain well-defined canons and methods. The following pages will present briefly Quetelet's work and conclusions in this field, and will consider the nature and value of statistical regularities and the principles of the method followed.

In the "*Recherches statistiques sur le Royaume de Pays-Bas,*"[1] Quetelet makes his first study in moral statistics. Aside from the comparisons of France and the Low Countries he studies the ratio of condemned to accused, the distribution of crimes by the age and sex of the perpetrators, and the number of crimes against persons and against property committed by the persons of each age group. This last matter is presented in a table, there being twelve age groups between those under sixteen and those over eighty. In this he gives for the first time a scale of the *penchant au crime* for the various age groups, that is, the ratio between the number of persons and the number of crimes for each group. He then compares the numbers for three years under various aspects, emphasizing the remarkable uniformity of the numbers from one year to another.[2]

The "*Recherches sur le penchant au crime aux différens âges,*"[3] is easily Quetelet's most comprehensive study of crimes. It contains sections on the *penchant au crime*

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[1] *Nouv. mém.*, vol. v, pp. 25–38.

[2] See quotation, chap. II, p. 55, *supra*.

[3] *Nouv. mém.*, vol. vii, 88 pages.

in general, and on the influence of education, climate, seasons, sex and age on this propensity. The distinction of crimes against persons and against property is preserved throughout. At this point we wish to note only his emphasis on the constancy of the numbers from year to year. He places as much confidence in his scale of propensity to crime as in his scale of stature or of mortality.[1] After pointing out that murders often follow quarrels and other apparently fortuitous encounters, he says, "Nevertheless experience has proven, that not only murders are annually almost in the same number, but even the instruments which are used to commit them are employed in the same proportions. . . Thus . . . we pass, *etc.*,[2] as quoted in chapter II, p. 55. And he closes with the famous sentence, "There is a budget which we pay with a frightful regularity; it is that of prisons, chains and the scaffold."[3]

The *Sur l' homme* of 1835 added to the preceding essay a chapter on suicides and duels in the characteristic manner, and several brief articles of 1835 and 1836 in the *Bulletins de l' académie royale de Bruxelles*[4] were devoted partly to general considerations on the freedom of the will and the regularity of certain social phenomena. So great does he find the constancy in the number of marriages by age groups that in the essay of 1847 he is able to present a scale of the propensity to marry,[5] and similarly in the essay of 1848 he calculates a scale for

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[1] *Op. cit.*, p. 71; also English trans. of *Sur l'homme*, p. viii.

[2] *Ibid.*, p. 79. [3] *Ibid.*, p. 81.

[4] "Sur les maladies des conscrits en France," vol. ii (1835), pp. 277–279; "Sur la justice criminelle en Belgique," *ibid.*, pp. 369–372: and "De l'influence de l'âge sur l'aliénation mentale et sur le penchant au crime," vol. iii (1836), pp. 180 and 210.

[5] "Statistique morale," *Bulletin de la com. cent. de stat.*, vol. iii (1847), especially note pp. 140 and 141.

suicides.[1] In these later studies he repeatedly emphasizes the impressive regularity in the figures from year to year.[2]

It was this emphasis upon the constancy of the social "budgets" which brought upon Quetelet the charge of being a fatalist and a materialist. It was this also which called forth the widest discussion and an abundant literature on the meaning and implications of the regularities revealed by moral statistics.[3] Quetelet's explanation of this constancy is therefore not without interest. He has nowhere given a formal and thorough discussion of this question, hence it will be necessary to bring together some of his most pertinent ideas.

Quetelet held quite consistently to the proposition that there is no such thing as a real chance occurrence, that is, there is no such thing as an uncaused or unrelated event.[4] If events have causes, and the same causes persist from one period of time to another, then the same events may be expected to reoccur. This principle received its first expression in the *Recherches statistiques* of 1829 in the form, "The same causes persisting we ought to expect the same effects to be reproduced."[5] "The laws presiding over the development of man, and modifying his actions are in general the result of his organization, of his education or knowledge, means or wealth, institutions, local influences and an endless variety

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[1] "Sur la statistique morale," *Nouv mém.*, vol. xxi, p. 36.

[2] See particularly "Statistique morale," p. 143, *et seq.*, where he speaks of the number of marriages as another "budget controlled by the customs and the needs of our social organization."

[3] See Von John, *Geschichte der Statistik* (Stuttgart, 1884), pp. 362, *et seq.*; for a summary of views of many writers on this subject see Block, *Traité statistique*, pp. 137, *et seq.*

[4] See chap. i, p. 18, *supra*.

[5] Page v, and repeated many times, especially English trans. of *Sur l'homme*, p. vii and p. 6.

of causes . . ."[1] Quetelet lays much stress on the influence of physical environment[2] and of social conditions and institutions. Man not only possesses individuality, he is also a member of society. "From this point of view, the regularity which we note in the formation of marriages ought to be attributed not to the volition of individuals, but to the habits of this concrete being which we call a people, and which we regard as endowed with a volition of its own and with habits from which it frees itself with difficulty."[3] "Moral causes which leave their traces in social phenomena are then inherent in the nation and not in the individual."[4] Variations in the marriage statistics of different provinces are due "to moral causes which exist outside of the individual and which are peculiar to each people. These moral causes have not essentially a character of fixity, as have causes in nature, but they fluctuate and vary with time."[5]

> *It seems to me that that which relates to the human species, considered en masse, is of the order of physical facts;* the greater the number of individuals the more the individual will is effaced and leaves predominating the series of general facts which depend on the general causes, in accordance with which

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[1] *Ibid.*, p. 7; first stated in "Recherches sur la loi de croissance de l'homme," *Nouv. mém.*, vol. vii, p. 1 of the essay.

[2] *Du Système social*, p. 8.

[3] "Statistique morale," p. 142.

[4] "Sur la statistique morale," *Nouv. mém.*, vol. xxi, p. 6. In "Statistique morale," p. 138, he says, "All occurs as if a people had intended to contract annually almost the same number of marriages and to divide them in the same proportions among the different provinces, between city and country, and between bachelors, maidens, widowers and widows."

[5] "Statistique morale," p. 142; in *Sur l'homme*, § 2, he says, "The laws which relate to the social body are not essentially invariable; they change with the nature of the causes producing them."

> society exists and maintains itself. These are the causes we seek to ascertain, and, when we shall know them, we shall determine effects for society as we determine effects by causes in the physical sciences.[1]

This last quotation contains the gist of Quetelet's explanation. General social conditions influencing the greater part of the social group, result in tolerably constant social phenomena, because, according to the law of large numbers, the effects of general causes gradually prevail amidst the multitude of variations due to minute causes.

Several consequences followed, in Quetelet's view, from these principles. In the first place, if the general social conditions act upon man in such an apparently irresistible manner when a social group is observed, then society as a whole must be made responsible for the moral "budgets" due to social conditions.

> The crimes which are annually committed seem to be a necessary result of our social organization. . . . *Society prepares the crime and the guilty is only the instrument by which it is accomplished.* Hence, it happens that the unfortunate person who loses his head upon the scaffold, or who ends his life in prison, is in some manner an expiatory victim for society. His crime is the result of the circumstances in which he finds himself, and the severity of his punishment is perhaps another result of it.[2]

A second consequence is that the sphere of individual freedom is very narrowly limited. Quetelet seems some-

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[1] "Recherches sur le penchant au crime," pp. 80–81 of the essay; see also "Recherches sur le poids de l'homme," p. 10.

[2] *Sur l'homme*, last section; English trans., p. 108; see also p. 6 of the translation.

times wholly to deny the existence of free will, but, as a rule, he speaks of it as a capricious element acting within a narrow circle of possibilities.[1] In this view man's will is capable of producing the infinite variety found in individual action, but cannot upset the rules of the social organization. The individual becomes an accidental cause, and its effects mere accidentalities; hence, when a social group is viewed, these effects are neutralized in the same manner that accidental errors are eliminated in making a series of measurements.

Charged with being a fatalist Quetelet answered by asserting a positive conviction that man can ameliorate his own condition by his own efforts.[2] We have seen that he believed the "moral causes which leave their traces in social phenomena" to be capable of change.[3] Such changes are, in his view, to be brought about through the action of "moral forces" exercised by man in modifying the conditions in which he lives.[4] But these "moral forces" are perturbative in their manner of action and the changes they bring about are very slow, like the secular changes in the solar system: for this reason the "moral causes" which predominate in the social system cannot undergo any sudden change.[5] This perturbative action of man, according to Quetelet, depends upon the exercise of his reason and increases with the growth of

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[1] *Sur l'homme*, Eng. trans., p. vii; *ibid.*, "Introductory," § 2, p. 6; *Du Système social*, pp. ix, 8, 9, 65, *passim;* "Statistique morale," p. 136; "Sur la statistique morale," pp. 6, 22 and 35, *et seq.*

[2] "Recherches statistiques" (1829), note, p. 25; English trans. of *Sur l'homme*, p. vii.

[3] *Supra*, p. 87.

[4] "Recherches sur la loi de croissance," pp. 1 and 2, and "Recherches sur le penchant au crime," pp. 2 and 80.

[5] "Recherches sur le penchant, *etc.*," p. 80.

knowledge.[1] The causes over which man has some control are the social institutions; and since the modification of effects must begin with the modification of causes, the betterment of results must begin with a reform of social institutions.[2] In order that this reform may be carried out with wisdom and intelligence, it should be the part of the statistician, thought Quetelet, to make known, so far as possible, the social effects traceable to special institutions, and the part of the legislator, in the light of this knowledge, to ameliorate social conditions.[3]

The preceding paragraphs make more or less clear Quetelet's explanation of statistical regularities, his deliverances on the question of social responsibility for crime, and his hope for a positive progress as man grows in scientific knowledge. Is his position satisfactory?

Attempted explanation of the regularities of moral statistics has been the cause of much fruitless discussion, because attention has been centered upon the implications that may or may not be drawn with reference to the freedom of the human will. We may avoid this barren philosophical discussion by starting from a principle which makes it impossible and by limiting ourselves strictly to the field of scientific inquiry. It does not seem possible for any science to take any other attitude toward the phenomena with which it deals, than that they are related in direct and complete continuity with

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[1] "Recherches sur la loi de croissance," p. 2.

[2] "De l'influence de l'âge sur l'aliénation mentale et sur le penchant au crime," *Bull. de l'acad.*, 1st Series, vol. iii, p. 185.

[3] *Sur l'homme*, bk. iv, final section; Eng. trans., p. 108; "Statistique morale," p. 146; "Sur la statistique morale," pp. 18-19 and 36; "Sur la statistique criminelle du Royaume-Uni. de la Grande-Bretagne. Lettre à M. Porter, à Londres, par M. A. Quetelet," *Bull. cent. com. de sta.*, vol. iv, p. 121.

preceding or contemporaneous phenomena. That is, the causal explanation of a phenomenon must be found in antecedent and coexisting conditions where it arises, without resort to some extraneous, unrelated or capricious element. In so far as a phenomenon is a pure accidentality it is not material for scientific inquiry. If any series or group of phenomena of a pure-chance sort were subjected to investigation, no order or relation would be discernible among them. Human reason would be useless and powerless in their presence, and inference would be impossible. If man's choices were of this sort, psychology would be forever a futile pursuit and education useless and purposeless. To illustrate such a condition by the usual figure of drawing balls from a bowl, one must conceive a bowl to contain a multitude of balls of an equal number of shades of color.[1] The problem to be solved would be to ascertain from a finite number of draws the probable order of future draws, or the ratio of balls of one shade to those of other shades. Even the largest conceivable number of draws would give no grounds for inference. Under such circumstances we must forever remain in the dark with no guide for our conduct other than unreasoning fear and superstition. The reasoned and ordered knowledge which science seeks is possible only under the assumption that the efficient causes of events are found in antecedent conditions.

This principle of efficient causation must then be extended to the sphere of human conduct. This is where the rub usually comes. The older view of a self with a will extraneous to the motives to action and with a power

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[1] Jevons, *Principles of Science* (London, 1905), p. 2, refers to Condorcet's expression, "an infinite lottery."

of fiat regardless of the conditions of life has generally been discarded. But many, like Quetelet, who give great emphasis to the necessities which the conditions of life force upon us, still reserve a little circle within which this old-time self may disport at pleasure, and exercise its will without let or hindrance. According to the view which we present as the only basis for scientific inquiry, even this little circle and the self, independent of character, motives and conditions, must be given up. This is a completely and frankly deterministic basis. It still preserves that conception of free will which means ability to act in accordance with our own character and motives —the sort of freedom of which all are conscious. Moreover, when it is once seen that scientific knowledge is dependent on their being an order in man's world, and that true freedom for man is dependent upon the acquisition of a knowledge of that order, it may be added that the deterministic basis makes possible the only freedom that is worth while or even possible for rational creatures.

It seems perfectly sound then to find the explanation of statistical regularities in the persistence of causes. Were we in imagination to reduce society to a state akin to the static state of the economist, in which the internal and external conditions obtaining throughout the population were exactly duplicated from one year to the next, we should not be astonished at the repetition with a dull monotony of the whole gamut of social budgets. But in actual dynamic society, conditions change slowly. Certainly the physical environment does not greatly vary from one year to the next; the physical qualities and the mental traits of the population, and its distribution by age groups, change little in two succeeding years; the social institutions, the customs and beliefs, and knowledge likewise change little. Hence the approximate repetition

of the numbers of social events from year to year. There will be, for example, about the same number of persons in the population, who by hereditary qualities and experience, are capable of committing murder under certain incentives. From one year to another about the same number of persons thus prepared meet the needed incentives, and the deeds are done. Similarly with the number of suicides, or births or marriages. The explanation is at bottom not different from that of the recurrence of approximately the same number of deaths from year to year.

How then shall the fluctuations in the numbers from year to year be explained? Quetelet seemed to think that these fluctuations were the effects of man's free will.[1] For this reason the average of the numbers for several years shows the effect of general causes, to the exclusion of free will, even, as the true ratio of the balls in the bowl is approached as the number of draws is increased. This however must be viewed as an erroneous explanation of the fluctuations. It seems to assume that the causes are perfectly constant, but that the number of persons who capriciously willed to yield or not to yield to their influence varied. But if the tolerable constancy of results is explained by a tolerable persistence of causes, then the fluctuations must similarly be explained by variations in the causes. The number of causes is extremely large, and the fluctuations in the results are due to differences either in the intensities or in the combi-

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[1] This seems to have been the view also of Prof. Richmond Mayo-Smith. He says, "With all the regularities there are numerous irregularities which leave room for the freedom of the individual. And it is scarcely possible that statistics will ever be so perfect an instrument of investigation as to destroy these variations." *Statistics and Sociology* (New York, 1895), p. 27.

nations of the causes. Moreover these variations in the causes, instead of being an evidence of man's free will, are for the most part entirely, as yet, beyond his control. Biological variations in the structure of brain and nervous system, some unknown element in ancestral heredity, may be partially responsible for fluctuations in the rate of suicide; or a crop failure may account for an increase in crimes against property. The point is simply that we cannot assume a causal explanation with respect to the regularities and a fantastic free-will explanation with respect to the fluctuations.

This holds true also of the variations about the mean were the population distributed with respect to some moral trait, as tendency to crime.[1] Such a distribution would be more or less well represented by the normal law of error, the variations running through all degrees from abhorrence of crime to a keen delight in it. Such a distribution would thus approximate the distribution of chances. Does this not indicate that there is some purely chance or free-will element which makes it necessary to provide for more or less extensive deviations from the type form? The deviations undoubtedly exist but they are not due to some capricious element assumed to exist in each person. The deviations indicate a freedom on the part of each person in the group to act in

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[1] We may recall here a distinction made in the preceding chapter between those statistical studies which ascertain the so-called social budgets, and those which distribute the members of a social group with respect to some trait, the distribution being assumed usually to be normal. In the preceding paragraph the fluctuations from year to year, found by the former kind of studies, were considered. In this paragraph the variations represented by the law of error are considered. Quetelet suggested such a distribution as this for mental and moral traits, but did not actually make any such distribution. See chap. iii, pp. 75-76, *supra*.

agreement with his character and motives, but even as the location of each chance in a scale of chances is determined by a possible combination of causes, so the location of each person in the scale of distribution is determined by that combination of causes which has determined his character and motives. What that combination is in any particular case may be inscrutable, with the result that particular actions are as unpredictable as the result of a chance draw. But the word chance in this case differs from what we have called pure or absolute chance, in that it is merely a blanket term for our ignorance of and inability to weigh the many minute causes which determine the result. So the variations of the members of a group about their mean, and the location of every member in the scale of distribution are determined by the inscrutable and almost infinitely variable differences in heredity and environment. The differences in natural abilities, in experience, training, education, beliefs, are sufficient to explain, in the scientific sense, the variations about the mode or the mean.

It has often been stated by writers on this subject that the statistical regularities have no compelling power over the individual.[1] Recall at this point the manner in which the regularity is formed. It is formed by counting the repetitions of a particular moral act during equal periods of time in a population group. The number of suicides in the United States in a series of years would constitute such a regularity. Now what can be meant by the statement that the regularity exerts no compulsion over the individual, that the individual is free but the mass is not, that the rule exists, but the individual may or may not follow it? From the point of view

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[1] See, for example, Mayo-Smith, *op. cit.*, p. 27.

adopted in this essay the only possible interpretation is that, whereas there is a high degree of probability that the group as a whole will show about the same number of suicides during the year following, it is impossible to say what particular individuals will do the deeds. But this is due merely to our ignorance of the causes[1] operating in particular cases. The regularity of moral statistics is in this respect similar to the figures of a mortality table, as has often been pointed out. The inability to predict the death of a given person from the data of a mortality table is no evidence that this person *willed* not to die at any particular time we might set. The conditions of life and character determine whether this or that individual shall be numbered among the suicides. Moreover, from the manner in which the statistical regularity is formed it is evident that the persons contributing to the so-called budget in any year are a small, and, in many cases, a selected group. They are found at one extreme of the curve representing the whole social group. They show the results of particular combinations of causes. The persons represented by the other slope of the curve are in no *danger* of becoming suicides; their conditions of nature and nurture prevent such a result. It would seem then that the statement that the regularity of the mass exerts no compelling power over the individual is at least unenlightening. It is only a truism or corollary from the method of finding the regularity. A more accurate description is given by the statement that the same causes which produce the regularities do, through differences in their intensity or their

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[1] By causes as used throughout this essay is meant simply the antecedent conditions of an act, that is, inherited structure and the impresses of past experience.

combination, determine the course of the individual; but that only a very small part of the group is subject to those particular combinations of causes, whose effects appear in the regularities. If the statement in question should be interpreted to mean that the individual is not subject to the general conditions of the life of the group in which he lives, then we may invoke the whole body of social science to show that it is distinctly not true.

It is usually assumed as a corollary of the statement considered in the preceding paragraph that the demonstration of the regularities does not disprove the doctrine of free will. This is true if by free will is meant action in agreement with our character and motives, but not true if a capricious element is meant. As already stated, if we explain the regularities by constancy of causes, it is at least inconsistent not to explain the variations by changes in the causes. Furthermore, when it is shown that the regularity changes with a change in the conditions, what other interpretation is possible, than that human action is determined by the conditions of human life?

Similar to the foregoing is the statement that the doctrine of free will cannot be disproven by statistics. With equal facility it might be said, the doctrine can be proved or disproved only by statistics.[1] If by this doctrine is meant an uncaused cause, a self-originating something without an antecedent but with a consequent, though having only a small circle of activity, then it is certainly true that statistics cannot *demonstrate* its non-existence. For statistics deals only with groups, and it will never be able to eliminate one cause of group variation after an-

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[1] Quetelet, English translation of *Sur l'homme*, § 2, says, in answer to his question "Are human actions regulated by fixed laws," "Experience alone can with certainty solve a problem which nc *à priori* reasoning could determine;" also *Du Système social*, p. 65.

other, and correspondingly reduce the group, until the individual is reached. The causes of variation are practically innumerable, and to attempt to eliminate them one after another to see whether a final capricious and unaccounted-for element remains is not only impossible but would be unending were it possible. If however the doctrine means only that we are able to do this or that if we wish to do it, then it is not at all in conflict with the explanation of statistical regularities here set forth. For this would simply mean that our character and motives determine our actions—character and motives being themselves products of the past brought into contact with present stimuli.

Are the statistical regularities of such a nature as properly to be called social laws? Quetelet seems to have thought that his regularities were social laws comparable to the laws of physics. He speaks frequently of the social system in such terms as suggest the *Système du monde* of the astronomer. After defining the average man as analogous to the center of gravity in bodies, he says, "If we wish in some way to establish the bases of a social mechanics, it is he whom we ought to consider, without stopping to examine particular or anomalous cases."[1] In the *Recherches sur le penchant au crime*[2] he states that the average man will undergo modification in time. It should then be determined

> whether these modifications are due to nature or . . . to certain forces, of which man disposes according to his free will. . . The science which would have for its object such a study would be a true *social mechanics,* which, no doubt, would

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[1] Recherches sur la loi de croissance de l'homme," p. 4.

[2] Page 2. See also "Recherches sur le poids de l'homme," pp. 10, 11 and 12.

present laws quite as admirable as the mechanics of physical bodies, and would bring to light principles of conservation which might be perhaps only analogous to those which we already know.[1]

He often repeated the statement that the results obtained by viewing a large group of men were of the order of physical facts.[2] In the *Letters*[3] he says:

> This great body (the social body) subsists by virtue of conservative principles, as does everything which has proceeded from the hands of the Almighty. . . . . When we think we have reached the highest point of the scale we find laws as fixed as those which govern the heavenly bodies: we turn to the phenomena of physics, where the free will of man is entirely effaced, so that the work of the Creator may predominate without hindrance. The collection of these laws, which exist independently of time and of the caprices of man, form a separate science, which I have considered myself entitled to name *social physics*.

In the first place it is doubtless an exaggeration, or an inaccuracy to speak of the regularity itself as a statistical or social law. The average number of suicides in Belgium, for example, merely acquaints us with a social fact. Such a fact is itself variable and has only a greater or less degree of probability of being repeated in the succeeding year. Such a fact however becomes the basis of more or less inclusive social laws when relations of coexistence and sequence are established between it and the conditions in which it arises. The establishment of such relations will of course pass through all the stages

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[1] Page 2. See also "Recherches sur le poids de l'homme," pp. 10, 11 and 12.

[2] See *supra*, p. 87.

[3] Page 178.

from hypothetical generalization to more or less exact quantitative statement. Changes in the fact thus become clearly and even quantitatively correlated with changes in its conditions. But while both the statistical fact and the social laws found through its correlations have considerable scientific value, when tested by their usefulness in prevision, such value is not so great as that of many of the laws of astronomy and physics. In the case of these latter, inferences have a degree of assurance only slightly removed from certainty, owing to the completeness of the induction, the permanency and simplicity of conditions and the facility with which effects attributable to a certain condition or to certain conditions may be isolated. But in the statistical study of social phenomena the complexity and variability of conditions and the very great difficulty of isolating the effects of particular causes give to inferences from established causal relations to future events more or less uncertainty. Not only do we not know with exactness the influence to be attached to each one of the conditions essential to the production of a social event but we do not know the proportions which will persist among the conditions themselves. Thus it may be shown that the marriage rate in England tends to vary directly with the amount of foreign trade per capita of the population,[1] but a quantitative statement of the degree of change in the former following a specified change in the latter can be made only with a considerable margin of error. This is because the influence of the amount of imports and exports (or any other index of industrial activity) on the marriage rate cannot be sufficiently isolated from other

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[1] A. L. Bowley, *Elements of Statistics* (2d ed., London, 1902), pp. 174, *et seq.*

influences, such as age grouping of the population, standards of living and social customs. It is also due to the fact that all the conditions determining the marriage rate, and consequently the marriage rate itself, change more or less rapidly from decade to decade.

It does not seem probable therefore that social laws derived from the study of the regularities of moral statistics will ever become sufficiently general to be "independent of time and the caprices of man," as Quetelet expected. Even the law of mortality changes slowly with succeeding generations. But concrete social phenomena change from place to place and time to time and may come quickly into vogue and as quickly disappear. Not only are there variations about the average result for a series of years but the type itself changes with its conditions. Quetelet's hope of arriving at statistical laws independent of time and place was based apparently on his assumption of constant causes. He always spoke of the average as resulting from such causes and hence free from the effects of variable and accidental causes. But yet he believed man capable of bringing about secular changes in the social budgets.[1] Quetelet however did not reconcile these conflicting notions,[2] nor did he anywhere demonstrate the existence of a constant cause. Were the types of social phenomena the results of really constant causes, then their true values could be indefinitely approached by more and more observations. But the average keeps shifting in obedience to the changing conditions of dynamic social life. The illustration of drawing balls from a bowl in

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[1] See pp. 87 and 89, *supra*.

[2] For the same conflict with reference to the Average Man, see chap. iii, p. 78, *et seq.*, *supra*.

which are an infinite number of white and black balls in a fixed or determined ratio, which may be forever approached, is not true to the conditions in society. The ratio must be represented as changing slowly. While therefore holding to the mechanical nature of social causation, which was fundamental in Quetelet's view, the problem of discovering or verifying social laws by a statistical process must be made immensely more difficult than he ordinarily represented it to be. For the want of the concept of evolutionary change Quetelet's social physics did in fact provide only for a "social statics." To this must be added the more difficult sphere of "social dynamics." Not only must the statistical regularity be correlated with certain dominant social conditions, but the order of changes in the regularities themselves as correlated with developing social life must be discovered and epitomized in the form of scientific law.

The preceding paragraph makes it unnecessary to emphasize a point made much of in Venn's *Logic of Chance*[1] that, inasmuch as the type in moral statistics is constantly changing, not only can it not be indefinitely approached by long-continued observation, but it may be even missed altogether if statistics are collected through so long a time that the results arise under different sets of circumstances.

It remains in this chapter to state certain basic principles of procedure followed by Quetelet in the study of the moral actions of men. In estimating the physical qualities of men; some, as height and weight, may be measured directly, while others, as strength, can be appreciated only by their effects. It is not absurd to say that one man is twice as strong as another with respect

[1] Second edition (London, 1876), pp. 15, 16 and 83 to 89.

to pressure of the hands, if this pressure applied to an obstacle produces effects in the ratio of two to one, conditions being the same for the two men.[1] Similarly in the appreciation of man's moral and intellectual traits it is necessary to admit as fundamental that "*causes are proportional to the effects produced by them.*"[2] Thus, from a study of actions, literary products, or other effects which may be attributed to the presence of a particular mental or moral trait, there is sought a knowledge of the trait itself. This principle was probably derived by Quetelet from the principle of probabilities that the ratio of white to black balls in an urn is that shown by many drawings. Quetelet applied it in the measurement of certain mental and moral traits at different ages, in the same way in which it would be used by the psychologist in the study of mental traits and abilities. This principle is however precisely the same as that which must be used by the sociologist in the inductive study of "types of mind" and "types of character" of a population.[3]

The second principle posited by Quetelet is one that is essential to all statistical inquiry, namely, that reliable results can be obtained only by the study of many rather than few individuals. It is the group rather than the individual upon which attention must be centered. It is only thus that any order or generality can be ascertained amidst the apparently chaotic diversity that is so bewildering when the members of a social group are viewed singly. Here again we meet with a principle derived from the study of probabilities, namely, "that many in-

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[1] "Recherches sur le penchant au crime," p. 6.

[2] *Ibid.*, p. 7. "Sur la statistique morale," p. 7.

[3] Giddings, *Inductive Sociology* (New York, 1901), chap. ii.

dependent disturbing causes of small individual effect neutralize one another in the mass."[1] To these two general principles might be added many particular ones derived from Quetelet's discussion of the necessity of comparability of data, of the extent to which small diversities in the data may be neglected when the numbers are large, and of the incompleteness of the records of moral actions."[2]

It is possible to make a number of criticisms of Quetelet's results, both in the study of the development of dramatic talent and in the study of the *penchant au crime* by ages. Suffice it to say that he was inclined to make an exaggerated use of the second principle noted above. He relied too much on mere multiplication of instances to overcome divergences in the instances themselves.[3] But such criticisms by no means affect the validity of the general principles of his procedure. A scale of *penchant au crime* derived from the mere number of crimes by age groups, without regard either to the differences in the gravity of the crimes or to the varying proportions in which different kinds of crime are detected,[4] would not be thoroughly accurate. But this means only that attention must be given to these causes of error. To study man's nature from the manifestations

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[1] Bowley, *op. cit.*, p. 263.

[2] See "Recherches sur la Roy. de Pays-Bas," pp. 29–30; "Recherches sur le penchant au crime," pp. 10 and 17, *et seq.; Bull. de l'acad.*, vol. ii, note p. 370; *Letters*, p. 219, *et seq.*, and especially the first pages of "Sur la statistique morale."

[3] That he was not unaware of the error here involved is shown by his statements in *Sur l'homme*, bk. iii, chap. i, § 3, fourth paragraph.

[4] A larger proportion of crimes of violence are detected and brought to justice than of petty thefts. Since therefore crimes of violence, by Quetelet's tables, are more numerous at ages 21–25 and 26–30 than at others, the scale based on numbers only is unduly large for these groups.

of that nature, to study social conditions by means of their products, and to study groups rather than individuals in order to neutralize individual peculiarities are not only valid but absolutely indispensable in statistical research.

It is thus in Quetelet's studies of the moral actions of men that is to be found the basis of the quantitative study of social life. The Berlin Academy of Science and Náum Reichesberg doubtless exceeded strict accuracy in hailing Quetelet as "the founder of a new science," "social physics," or "sociology."[1] Sciences pass through various stages before they become quantitative. As the true pioneer in the field of moral statistics, however, he formulated and applied with impressive effectiveness the method of research which is especially appropriate in sociology and economics. It does not seem at all impossible that the social sciences may one day approximate the exactness of the physical sciences. Quetelet would then appear as the most conspicuous among the early workers in the field of exact social science, and as the first formulator of the quantitative method in the study of social phenomena. The demonstration of those regularities in human actions which evidence the presence of law, and the formulation of the method for their discovery were immense contributions to man's knowledge of and power over his world. Though Comte used both the words social physics and sociology, he did not succeed in formulating a method of investigation. This was done by his scorned[2] contemporary, Quetelet.

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[1] See chap. i, p. 33, *supra*.

[2] Auguste Comte, *Cours de philosophie positive*, (4th ed., Paris, 1877), vol. iv, p. 15, note.

CHAPTER V

STATISTICAL METHOD

In the preceding chapter it was stated that Quetelet's main contributions to social science were his demonstrations of and insistence upon the regularity and order in social phenomena and his formulation of a method for discovering this order. The exaltation of statistics into an exact instrument of observation was more uniquely his service than his contention that there are laws of human action and social life. The latter was by no means a new doctrine—even the inductive study of statistical regularities had been more or less steadily carried on since the days of Graunt's *Observations*. But no one before Quetelet saw so clearly as he that the basis of the method of observation in the biological and social sciences must be founded on a general characteristic of social phenomena themselves, namely, their variability about type forms. This variability is in fact a very general characteristic of all observations in which counting or measuring is resorted to. Whether in estimating the height of an animate or inanimate object from many measurements, or the average height of a group of like things, as a group of men, whether we seek the reaction time of a single individual or of a group of individuals there is found a variation of the results about the average or type. Quetelet's conception of the average man was based on the doctrine that in all that relates to social groups there will be found this variability about the

group average. His statistical method therefore became a search for averages, for the limits of variation and for the manner in which this variation, under ordinary conditions, would occur. It was his general supposition that the distribution about the mean would agree with the distribution of probabilities shown by the probability curve. The first step in the presentation of his method will therefore be an exposition of the derivation of his probability scale, and its use in the study of averages and deviations. Then we shall pass to Quetelet's classification of causes and his methods of locating them.

On its theoretical side Quetelet's statistical method was the outgrowth of an application of certain principles of the theory of probabilities to his researches. Such application is shown in a general way throughout his earlier works in his insistence upon the study of groups, or the employment of large numbers of observations, in order to allow the effects of accidental causes to neutralize themselves; in his statement that "the precision of results increases as the square root of the number of observations;"[1] and in his suggestion of the use of the probable error in determining the value of data.[2] But his ideas were not given systematic treatment previous to the essay *Sur l'appréciation des documents statistiques, et en particulier sur l'appréciation des moyennes.*[3]

In the first part[4] of this essay he classifies causes as constant, variable and accidental, and shows by examples how to detect their presence and how to eliminate the

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[1] *Sur l'homme*, bk. iv, chap. ii; English translation, p. 105.

[2] *Ibid.*, p. 103.

[3] *Bulletin de la commission centrale de statistique*, vol. ii (1845), pp. 205-286.

[4] "Première partie. Appréciation générale des causes et de leurs tendances."

effects of periodically variable and of accidental causes.[1] In the second part[2] he sets for himself the problem of determining "the degree of energy and the mode of action" of these causes. As introductory to this he inquires into the probability of results under various suppositions. In the first place,[3] he supposes the number of chances to be known, and to be rigorously equal to each other. The probability of the desired result is then expressed by a fraction having as its numerator the number of chances favorable to the event, and as its denominator the total number of chances. Thus, in drawing a ball from an urn containing three white and one black balls, the probability of drawing a white ball is $\frac{3}{4}$. The probability of drawing a black ball is $\frac{1}{4}$, and the sum of these two probabilities is unity, the symbol of certainty. If the urn contain an infinite number of white and black balls in equal numbers, the probability of drawing a white ball is $\frac{1}{2}$. In a few draws the ratio of the white to the black balls drawn may vary considerably from their ratio in the urn, that is, may be now too large and now too small, owing to the action of many accidental causes; but in a large number of trials there will be drawn almost as many white as black balls. This is due to the fact that the true ratio of the balls in the urn acts as a constant cause, giving to balls of each color the definite probability of one-half.

Quetelet supposes, secondly, that the number of chances is unknown.[4] In this case one knows neither the colors of the balls in the urn nor the ratio of balls

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[1] See *infra*, p. 129, *et seq*.

[2] "Deuxième partie. Appréciation mathématique des causes et de leurs tendances."

[3] *Ibid.*, § ii; *Letters*, p. 7, *et seq*.

[4] *Ibid.*, § iii.

of one color to those of another. But by repeated drawings one can determine both of these unknown facts. The precision of the ratios thus found, or their approximation to the true ratios, "increases proportionally to the square root of the number of trials."[1] "But the urn we interrogate is nature."[2] Thus, if one asks what is the ratio of male to female births, it is necessary to bring together the results for a series of years. The number of male births for every one thousand female births is found to vary in Belgium, 1834 to 1842 inclusive, from 1055 to 1076, with an average of 1065 to 1000. This ratio in nature is comparable to the fixed ratio of white to black balls in the urn; and in either case the true ratio is approached more and more closely as the data increase.

In the third place Quetelet inquires into the law of possibility when the number of chances is limited; that is, when the number of chances is small, how are they distributed? If the balls are drawn one at a time from an urn containing an equal number of white and black balls, it is clear that there are two equal chances, either a white or a black ball may be drawn. The two chances are divided equally between the two possible results or in the ratio of 1:1. If we wish to speak in terms of probabilities, instead of chances, we may say that either result has a probability of $\frac{1}{2}$. The sum of the probabilities of drawing a white and of drawing a black ball is therefore $\frac{1}{2} + \frac{1}{2}$, or unity.

Suppose next that from a long record of draws made one at a time, we unite the first and second, the third and fourth, the fifth and sixth, and so on, and that we represent white by *a* and black by *b*. The first one of

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[1] *Ibid.*, p. 230.

[2] See also *Letters*, p. 10.

the two balls drawn may be equally either *a* or *b*, and likewise the second may be equally *a* or *b*. If the first be *a*, the result of adding the second may be either *aa* or *ab*, and if the first be *b*, the result of adding the second may be either *ba* or *bb*. All four of these results, *aa*, *ab*, *ba* and *bb* are equally probable. Since however *ab* and *ba* are alike in composition, each being composed of one white and one black ball, there are in reality only three possible combinations, namely two white, one white and one black and two black, or *aa*, *ab* or *ba*, and *bb*. Among these three combinations the four chances are distributed in the order 1, 2, 1, or in the order of the coefficients in the expansion of $(a+b)^2$ or $a^2 + 2ab + b^2$. If now we inquire as to the probability of each of the combinations, we note that *aa* has one out of the four equal chances, *ab* (or *ba*) two out of the four and *bb*, one out of the four; therefore their respective probabilities are $\frac{1}{4}$, $\frac{2}{4}$, $\frac{1}{4}$,[1] the sum of which again gives unity. The probabilities may be obtained directly by expanding $(\frac{1}{2}+\frac{1}{2})^2$.

At the risk of tediousness the demonstration may be carried one step further, by supposing the draws to be taken in groups of three at a time. To each of the four equally likely results obtained by taking them two at a time will thus be added *a* or *b*. There is thus obtained eight equally probable combinations, namely *aaa*, *aab*, *aba*, *abb*, *baa*, *bab*, *bba* and *bbb*.[2] Out of these eight,

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[1] In the article "Sur l'appréciation, *etc.*," Quetelet does not touch upon the probability of a compound event. But in the *Letters* ("Letter vi") he shows that the probability of a compound event is equal to the *product* of the probabilities of the simple events composing it. Thus in the case just noted, the probability of drawing *a* or *b* is $\frac{1}{2}$; hence the probability of drawing *aa*, *ab*, *ba* or *bb* is $\frac{1}{2} \times \frac{1}{2}$ or $\frac{1}{4}$.

[2] From the preceding note it is clear that the probability of any one of these eight combinations is $(\frac{1}{2})^3$.

only one contains all white or all black, while three contain two white and one black, and three contain two black and one white. There are thus four different combinations, *aaa*, *aab*, *abb* and *bbb*, and the eight chances are distributed among them in the order 1, 3, 3, 1, or in the order of the coefficients in the expansion of the binomial $(a + b)^3$. The probabilities of the four combinations are evidently $\frac{1}{8}$, $\frac{3}{8}$, $\frac{3}{8}$ and $\frac{1}{8}$, or the results obtained by expanding $(\frac{1}{2} + \frac{1}{2})^3$, the sum of the probabilities being here, as always, equal to unity. If taken four at a time, there are five different combinations, among which are distributed sixteen equal chances in the order 1, 4, 6, 4, 1 or the coefficients of $(a + b)^4$. Moreover the probabilities of the five combinations are $\frac{1}{16}$, $\frac{4}{16}$, $\frac{6}{16}$, $\frac{4}{16}$ and $\frac{1}{16}$ respectively, or the results given by $(\frac{1}{2} + \frac{1}{2})^4$.

From these examples it appears that the distribution of the chances of the various combinations follows the order of the coefficients in the successive powers of the binomial expansion, or the series given by the successive lines of the arithmetic triangle.[1] There is in every case a perfectly symmetrical distribution of chances on either side of the most probable combinations. It must not however be supposed that the various combinations will, in actual experiment, be drawn in the proportions indicated by theory. Many accidental causes lead to fluctuations of the experienced distributions about the theoretical distribution; but in the long run these fluctuations are neutralized so that by a sufficient number of draws the actual distribution of the frequencies of the combinations can be made to approach indefinitely the theoretical distribution.[2]

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[1] Quetelet presents this triangle (*ibid.*, p. 235, and *Letters*, p. 60) up to the 13th line. See Jevons, *Principles of Science* (London, 1905), p. 182, *et seq.*

[2] *Letters*, pp. 35-36.

Quetelet next tests this agreement between theory and experience by making 4096 draws, one ball at a time, from an urn containing forty white and forty black balls.[1] Each draw is registered and the ball returned to the urn. The results are then studied to determine the proportion of black balls in all the possible combinations, when the draws are grouped two at a time, three at a time and so on up to twelve at a time. He also tests with satisfactory results the validity of the principle that the precision of results increases as the square root of the number of draws.

In the fourth place Quetelet inquires into the *laws of possibility* (or the scale of the distribution of chances) *when the number of chances is unlimited.*[2] He states that

> when we interrogate nature, the number of chances is generally presented to us as unlimited, that is to say, one must conceive that each group which is drawn from the urn may be composed of an infinite number of balls, and that, consequently, the number of groups may be likewise unlimited, and may present white and black balls in every imaginable combination.

But since the number of trials with which one deals in experience is always relatively limited, and since one can neither actually conceive nor calculate an infinite series, Quetelet believes all practical purposes will be served by the probabilities of the 1000 combinations that are possible when 999 balls are drawn at once from a bowl containing a multitude of white and black balls in equal numbers. The total number of chances in this case is represented by a number composed of more than three

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[1] "Sur l'appréciation, *etc.*," 2nd part, §§ vi and vii.

Ibid., § viii.

hundred figures. Since in all these chances there is only one of drawing all 999 balls of one color, such a result may be viewed as impossible. All the combinations having more than 549 balls or fewer than 450 balls of one color, whether white or black, have all together little more than one chance in one thousand, while all those combinations having more than 579 balls or fewer than 420 balls of one kind, have scarcely one chance in ten million. Hence it is useless to consider the probabilities of combinations beyond these latter limits.

Quetelet then presents a table (see *Table A* on the next page) showing the probabilities of drawing each of the combinations from the most probable one of 499 white and 500 black to the scarcely probable one of 420 white and 579 black.[1] Each of these eighty groups is paralleled by an equally probable one in which the colors are interchanged. Alongside of the scale showing the probability of each combination is a table (*Table B*) which gives the "scale of precision," or the sum of the probabilities beginning with the most probable group, and a table (*Table C*) giving the relative probability of drawing each group. Each combination is ranked, the most probable combination being rank one. The first twenty-two ranks of this scale are presented herewith.[2]

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[1] "Sur l'appréciation, *etc.*," pp. 244–245.

[2] For the complete table see *Letters* pp. 256–258; Bowley, *op. cit.*, p. 273 gives *Table B* and *Table C* for the eighty ranks.

Scale of Possibility and Precision

Groups of	Rank of groups......	Scale of Possibility.	Scale of Precision.	Scale of Possibility.
		Probability of drawing each group—*Table A.*	Sum of the probabilities, commencing with most probable group —*Table B.*	Relative probability of drawing each group —*Table C.*
499 white and 500 black.	1	.025225	.025225	1.000000
498 " 501 "	2	.025124	.050349	.996008
497 " 502 "	3	.024924	.075273	.988072
496 " 503 "	4	.024627	.099900	.976285
495 " 504 "	5	.024236	.124136	.960789
494 " 505 "	6	.023756	.147892	.941764
493 " 506 "	7	.023193	.171085	.919429
492 " 507 "	8	.022552	.193637	.894040
491 " 508 "	9	.021842	.215479	.865882
490 " 509 "	10	.021069	.236548	.835261
489 " 510 "	11	.020243	.256791	.802506
488 " 511 "	12	.019372	.276163	.767956
487 " 512 "	13	.018464	.294627	.731958
486 " 513 "	14	.027528	.312155	.694860
485 " 514 "	15	.016573	.338728	.657008
484 " 515 "	16	.015608	.344335	.618736
483 " 516 "	17	.014640	.358975	.580364
482 " 517 "	18	.013677	.372652	.542197
481 " 518 "	19	.012726	.385378	.504516
480 " 519 "	20	.011794	.397172	.467576
479 " 520 "	21	.010887	.408060	.431609
478 " 521 "	22	.010008	.418070	.396815

In deducing this scale Quetelet first found *Table C.*[1] As already shown the number of chances of any combination is given by its coefficient in the binomial expansion. If one represents the probability of the most frequent combinations by unity, the *relative* probabilities of other combinations with respect to unity may be readily

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[1] *Ibid.*, "Addition," p. 274, *et seq.; Letters*, "Notes," p. 259, *et seq.*

found. Now the coefficient of the general term in the development of the binomial is

$$\frac{m\,(m-1)\,(m-2)\,\ldots\,(m-n+1)}{1\,.\,2\,.\,3\,\ldots\,n}$$

and the term immediately following is

$$\frac{m\,(m-1)\,(m-2)\,\ldots\,(m-n+1)\,(m-n)}{1\,.\,2\,.\,3\,\ldots\,n\,(n+1)}$$

These coefficients show the respective chances of two succeeding combinations. Their ratio is as $1 : \frac{m-n}{n+1}$. If therefore the probability of the most frequent combination is represented by unity, the probability of the immediately succeeding combination becomes $\frac{m-n}{n+1}$. Moreover the coefficient of any term being known, the coefficient of the succeeding term may be found by multiplying the known value by $\frac{m-n}{n+1}$. It must be noted that n is always one less than the number of the known term. In drawing 999 balls at a time the most probable combination is 499 of one color and 500 of the other. This term in the series would be either the 500th or the 501st; as however Quetelet works with the second half of the symmetrical series, he begins with the 501st term. Representing its probability by unity, the probability of the succeeding combination, that is, 498 white and 501 black, becomes $\frac{999-500}{500+1}$, or $\frac{499}{501}$. This reduces to .996008. This is also the relative probability of drawing 498 black and 501 white. The probability of drawing 497 of one color and 502 of the other becomes $\frac{499}{501}$

multiplied by $\frac{m-n}{n+1}$ or $\frac{499}{501} \times \frac{498}{502}$. By this process were found the successive values of *Table C*.

Table A is next deduced. Designating by a, a', a'', *etc.*, the successive values of *Table C*, and their sum by Σa, Quetelet states that the absolute probabilities of *Table A* result from the divisions indicated by $\frac{a}{\Sigma a}$, $\frac{a'}{\Sigma a}$, $\frac{a''}{\Sigma a}$, *etc.*[1] Quetelet's description of his procedure is not quite accurate at this point. The values of *Table A* are in fact found by the following divisions: $\frac{a}{2\Sigma a}$, $\frac{a'}{2\Sigma a}$, $\frac{a''}{2\Sigma a}$, *etc.* The result of dividing each of the relative probabilities given in *Table C* by their sum is that the sum of the quotients thus obtained is equal to unity. This would mean that the sum of the absolute probabilities of one-half of the combinations should be considered equal to unity. But since the symbol of certainty is unity, the sum of the probabilities of one-half of the combinations must equal .50, as *Table B* indicates. Hence the individual relative probabilities must be divided by twice their sum in order to get the absolute probabilities.

From *Table A* is found *Table B* by adding the successive values. The sum of the probabilities as given for eighty ranks in *Table B*, amounts to .4999992. Doubling this, so as to include the probabilities of the parallel groups, gives .9999984. As unity represents certainty, the difference between one and .9999984 or .0000016 represents the total probability of all combinations beyond 579 of one color and 420 of the other.

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[1] "Sur l'appréciation, *etc.*," p. 275; *Letters*, pp. 260–261.

The distribution of the chances or probabilities for fifty combinations on each side of the most probable combinations is then presented graphically.[1] The respective probabilities are represented by rectangles, which by their relative sizes show the rapidity with which the probabilities diminish. Assuming that in nature the accidental causes of variation are infinite in number, and that consequently "events vary through infinite and imperceptible degrees,"[2] it is necessary, in order accurately to represent nature, to conceive the number of rectangles to be indefinitely increased and their width indefinitely diminished, until the lines joining their tops merge into a continuous curve. This curve is the *curve of possibilities* (*courbe des possibilités*). It shows the distribution of chances when their number is unlimited. Quetelet deduces the value of the mean term, or coefficient of the most probable combination when the number of terms is infinitely great, the probability of this term, and the formula for the curve of possibility itself.[3] He also makes a comparison between his scale, "calculated on the basis of a thousand different events," and that given by Cournot, "in which the probability of the expected event may pass through every possible gradation." He finds that one rank of his table corresponds closely to four and one-half ranks of Cournot's table.[4]

Throughout the foregoing development Quetelet continually assumed that the chances were equally favorable

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[1] "Sur l'appréciation, *etc.*," § ix, and chart at end of that essay; *Letters*, p. 68.

[2] *Ibid.*, p. 249.

[3] *Ibid.*, p. 276, *et seq.*; *Letters*, p. 263, *et seq.*

[4] *Ibid.*, p. 280, *et seq.*; *Letters*, p. 255, *et seq.*

to white and black balls. On this assumption he gets, in theory, the perfectly symmetrical distribution of chances shown by the coefficients of the binominal expansion. Moreover, this hypothesis provides for the occurrence of combinations farthest removed from the most probable one. Theoretically there is an infinitesimal probability for the combination having an infinite number of balls of one color. But, as Quetelet points out,[1] these extremely small probabilities may be neglected. When he comes to test the agreement between theory and practice[2] he finds that even in drawing as few as ten, eleven or twelve balls at a time, he does not get, in several hundred draws, a single combination of balls all of one color. Thus in experience the extreme combinations do not occur if the number of possible combinations is very great.

Quetelet passes next to the application of his law of possibility to scientific observations. This application involves Quetelet's theory of means. He says, "the theory of *Means* serves as a basis to all sciences of observation."[3] "In all things to which *plus* or *minus* may be applied, there are necessarily three things to consider, —one mean and two extremes."[4] "Means properly so called" are to be distinguished from "arithmetic means."[5] Their difference was not in the process by which they are found, for both are found by the method of finding an arithmetic average, but rather in the nature of the observations from which they are derived. The average of many measurements of the height of a certain house would give a true mean, while that of the heights of the

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[1] "Sur l'appréciation, *etc.*," p. 243; *Letters*, pp. 66–67.

[2] *Ibid.*, §§ vi and vii; *Letters*, pp. 62, 254–255.

[3] *Letters*, p. 38.

[4] *Ibid.*, p. 39.

[5] *Ibid.*, "Letter xi."

houses on a given street would be only an arithmetic mean. Many measurements of the same thing are bound together by a "law of continuity,"[1] they are grouped about their average "in a determinate order, which is that assigned by the scale of possibility."[2] It was one of Quetelet's most important discoveries that the measurements of the height or other physical trait of a group of men were likewise grouped about their average. Thus the average height, as represented by the average man, is a true mean.

Quetelet's law of the distribution of chances must first be related to the distribution of a set of measurements of the same thing about their mean and then to the distribution of biological measurements.[3] We deal then first with the *errors* of the measurements. Quetelet did not define the term error. It may be defined (1) as the difference between the true value sought and any measurement or (2) as the difference between the average and any measurement.[4] As the average approaches the true value through more and more measurements, the two definitions finally coincide. Quetelet made no systematic statement of the hypotheses underlying the theory of the distribution of errors, but they may be found, expressly or impliedly, in his work. They may be stated as follows:

(1) The average of a series of measurements repre-

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[1] *Letters*, p. 42.

[2] *Ibid.*, p. 77; "Sur l'appréciation, *etc.*," p. 250.

[3] Quetelet speaks indifferently of the distribution of errors and the distribution of measurements; and while of course the former distribution determines the latter, it is to the distribution of errors that the distribution of chances by the binominal law is assimilated.

[4] See Mansfield Merriman, *A Text-book on the Method of Least Squares* (3rd ed., New York, 1888), p. 5.

sents an approximation to the true value sought.[1] Theory indicates that the precision of this approximation increases as the square root of the number of observations.[2]

(2) The causes of the errors are called accidental causes. They are very numerous, even infinite in number; they act independently of each other; each is of small effect.[3]

(3) These causes are equally favorable to excess and to defect. "Each of the accidental causes . . . has the same probability of acting in one direction as (in) the other. This probability is then $\frac{1}{2}$."[4] This is the same as the probability of drawing a white or a black ball from a bowl containing an equal number of balls of each color. For this reason the errors resulting from the various combinations of many accidental causes of error will be distributed according to the binomial law. From this it follows both that the errors are symmetrically distributed about the mean and that "small errors are more numerous than large ones,"[5] or as Quetelet phrases it, the greater number of observations "occur in the immediate neighborhood" of the mean, and "the further we depart from the mean, the fewer observations will each group include."[6]

(4) Though the theory provides for errors of any amount, there are always more or less narrow limits beyond which errors do not occur.

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[1] *Letters*, pp. 72, 76, 90.

[2] *Ibid.*, p. 36, and "Letters" xvi and xvii.

[3] *Ibid.*, pp. 22, 107, 108, *et seq.*, *passim.*

[4] *Ibid.*, p. 280; see also pp. 77–78, 84.

[5] Merriman, *op. cit.*, p. 15.

[6] *Letters*, pp. 77, 90; "Sur l'appréciation, *etc.*," p. 250.

By very similar principles to the foregoing the law of the distribution of chances may be related to the distribution of biological measurements. In this case the average is an approximation to the group type. There are assumed to be a vast number of minute independent causes of deviation from the type or average, equally favorable to excess or deficiency of development. Finally small deviations are most numerous, the deviations become less numerous as they become larger, and there are limits beyond which deviations from the type do not occur in nature. Thus the Average Man becomes the type, about which all other men of a homogeneous group are distributed according to a definite law.

It was in the foregoing manner that Quetelet transformed the law of the combinations of two independent events when the number of chances is very large, that is the binominal law, into a law of error, and then made this latter serve as the law of distribution of variations among living things.

In testing the fit of a series of measurements to his scale of precision Quetelet usually made use of a table consisting of nine columns.[1]

The following example, showing the distribution of the chest measurements of 5738 Scotch soldiers, serves better than any other from Quetelet's writings to illustrate the process involved:

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[1] See "Sur l'appréciation, *etc.*," pp. 251, 252, 255, 259, 260; *Letters*, pp. 85, 88, 276, 277; and Bowley, *Elements of Statistics* (2d ed., London, 1902), pp. 278-279.

1. Chest Measurements.	2. Number of Men.	3. Proportional Numbers.	4. Probability according to Observation.	5. Rank in *Table B.*	6. Rank given by Calculation.	7. Probability according to Calculation.	8. Distribution given by Theory.	9. Difference between Experience and Theory.
33 inches.	3	0.0005	0.5000	....	....	0.5000	0.0007	—0.0002
34 "	18	0.0031	0.4995	52.0	50	0.4993	0.0029	+0.0002
35 "	81	0.0141	0.4964	42.5	42.5	0.4964	0.0110	+0.0031
36 "	185	0.0322	0.4823	33.5	34.5	0.4854	0.0323	—0.0001
37 "	420	0.0732	0.4501	26.0	26.5	0.4531	0.0732	0.0000
38 "	749	0.1305	0.3769	18.0	18.5	0.3799	0.1333	—0.0028
39 "	1073	0.1867	0.2464	10.5	10.5	0.2466	0.1838	+0.0029
			0.0597	2.5	2.5	0.0628		
40 "	1079	0.1882	0.1285	5.5	5.5	0.1359	0.1987	—0.0105
41 "	934	0.1628	0.2913	13.0	13.5	0.3034	0.1075	—0.0047
42 "	658	0.1148	0.4061	21.0	21.5	0.4130	0.1096	+0.0052
43 "	370	0.0645	0.4706	30.0	29.5	0.4690	0.0560	+0.0085
44 "	92	0.0160	0.4866	35.0	37.5	0.4911	0.0221	—0.0061
45 "	50	0.0087	0.4953	41.0	45.5	0.4980	0.0069	+0.0018
46 "	21	0.0038	0.4991	49.5	53.5	0.4996	0.0016	+0.0022
47 "	4	0.0007	9.4998	56.0	61.8	0.4999	0.0003	+0.0004
48 "	1	0.0002	0.5000	....	....	0.5000	0.0001	+0.0001
	5738	1.0000				1.0000		

The first column of this table gives the distribution of the units of measurement, in this case inches. The second column gives the frequencies of each group. The third column presents a series of proportional numbers, or the proportion represented by each group frequency when their sum is made equal to unity, the symbol of certainty. The process followed is to divide the total number of observations into unity, and then to multiply this quotient by each frequency in turn. This column gives in fact the probabilities that a measurement will fall under the corresponding groups noted in column one. The distribution being assumed to be normal or symmetrical, one-half of the total number of

measurements, or .5000 of the total probabilities should be on either side of the mean. The fourth column shows the probability of not exceeding a given measurement, that is, the total probabilities of all measurements from and including the given measurement to the mean. It thus corresponds to *Table B* of the probability scale. It is found by working inward toward the mean from either extreme, subtracting from .5000 the successive probabilities given by column three. In the fifth column are given the ranks corresponding to the probabilities given in column four, *Table B* being used for this purpose. Column five thus gives the actual distribution of the observations in ranks of Quetelet's scale.

In order to find the correspondence between experience and theory the foregoing process is now reversed. From the actual distribution of column five a theoretical distribution is found, column six showing the ranks with a uniform difference between them. By this process the distribution is so "smoothed" that each group covers the same number of ranks. Quetelet does not show how he selected the common difference in smoothing the distribution, though it can be approximated by averaging the differences between the ranks as given in column five. There is doubtless an element of arbitrariness in the choice of this difference. The object being to find the difference which gives the closest fit of the curve to the measurements, the true value can be indefinitely approached by repeated trials. From this sixth column is calculated, by the use of *Table B*, column seven corresponding to column four. The successive differences of column seven, working from the mean outward, give column eight, corresponding to column three. Column eight thus gives the probabilities that a measurement would fall under the respective groups, were they actu-

ally to occur according to the assumptions of the probability curve. In column nine appear the differences between the numbers of columns three and eight, showing the amount of the misfit for each group.

But "each series of observations has its particular scale of possibility. . . . The nature of this scale is determined by the number of observations, as also by the more or less precise means employed in making such observations."[1] If the observations are represented graphically by the curve of possibility, this curve contracts towards its axis in the ratio of the increase in the square root of the number of observations.[2] But assuming the observations to be equally numerous, "the contraction towards the axis is proportional to the degree of precision of the observers, and gives a measure of that precision. Our aim then should be to seek means of appreciating the contraction of the curve."[3] Such a means is found in the *probable error*. As its name implies this is that error or deviation from the mean which is as often exceeded as not exceeded. It thus designates the limits between which one-half of all the observations fall, or the divergence either side of the mean between which and the mean one-fourth of the observations are found.[4] Since *Table B* of Quetelet's scale gives the sum of the probabilities on either side of the mean, it is only necessary to locate the value .2500 in this *Table* in order to determine the rank of the probable error. The precision for rank 10 is .236548, and for rank 11 it is .256791.[5] Interpolating, one gets 10.6645 as the rank of the probable error.[6] The number of ranks included between the

[1] *Letters*, p. 77. [2] *Ibid.*, "Letter xvi." [3] *Ibid.*, p. 80.

[4] "Sur l'appréciation, *etc.*," p. 257. [5] See p. 114, *supra*.

[6] Quetelet commonly speaks of this rank as "about 10.5;" "Sur l'appréciation, *etc.*," p. 257. In the *Letters* he gives the rank as 10.67 on p. 271, and as "nearly 10.66" on p. 274.

positive and negative limits of the probable error would therefore be twice 10.6645 or 21.3390; Quetelet usually considered 21 ranks as sufficiently near the true value.

Assuming that the distribution should be normal, Quetelet calculated the probable error from the smoothed data. Having determined the best uniform difference between the ranks as given in column six,[1] he divides this number into 21 and multiplies the quotient by the dimension of a group as given in column one. This gives him in concrete units the distance between the two limits of probable error. One-half of this distance gives the probable error. A comparison of the probable errors of two sets of measurements of the same thing he considered a measure of their relative precision.[2]

In the notes of the *Letters* Quetelet calculates the odds of not exceeding various sizes of the probable error. This is done easily from *Table B.* Thus twice the probable error is 21.34 ranks. The precision for this rank is .411463, that is, .411463 out of .5000 of the probabilities lie between twice the probable error and the mean, while .500000 — .411463 or .088537 of them lie beyond this limit. The ratio of .411463 to .088537 is 4.64 : 1. Similarly the odds in favor of three or more times the probable error may be calculated.[3] Quetelet also gives[4] the relation of the probable error to the standard deviation. He, however, does not seem to have made any use of the standard deviation, though he says it is a quantity "of great importance."

It has been stated that Quetelet assumed the distribu-

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[1] See p. 122, *supra.*

[2] *Letters*, p. 82.

[3] Quetelet's method is somewhat more cumbrous though it gives similar results; *Letters*, p. 270, *et seq.*

[4] *Ibid.*, p. 272, *et seq.*

tion of the errors of a set of measurements to be symmetrical. This same assumption, extended to the variations in nature, gave a type about which the variations were evenly distributed. Thus his mean in theory became not only an arithmetic average but also the median and the mode.[1] It was on this basis that Quetelet viewed the degree of misfit of the measurements to the scale of possibility as a test of the degree of accuracy with which the measurements were made.[2] It would seem to be quite as plausible to consider the degree of misfit as a test of the accuracy with which the assumptions underlying the theoretical law of normal distribution can be applied to a particular set of observations. While we cannot, as the basis for a theory of the distribution, find any less arbitrary assumptions than that the causes of variation are infinite, minute and equal and that they are equally favorable to excess and deficiency,[3] yet it strains our credulity to believe that these assumptions must always be true to experience, especially in measurements of mass phenomena. In fact a perfect realization of these assumptions in experience would seem to be fortuitous, and deviations from the perfectly symmetrical distribution may vary through many degrees of asymmetry. The normal curve is thus to be viewed as a form of the distribution of variable objects in nature, approximately realized in some classes of phenomena, but as only one of the many possible forms.

Of this Quetelet seems to have been quite aware. For while in his illustrations he always assumed the normal

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[1] Bowley, *op. cit.*, p. 119, apparently does not consider Quetelet's average as the median and the mode. It is impossible to see how this conclusion can be reached.

[2] "Sur l'appréciation, *etc.*," p. 272.

[3] See Jevons, *op. cit.*, pp. 255 and 380.

distribution, he was fully aware of asymmetrical distribution and gave a satisfactory explanation of it.[1] He even contemplated part authorship of a treatment of such cases.[2] Quetelet explained the variations in nature not only by the various combinations of an infinite number of independent and minute causes, but also by the different "degrees of intensity of which these causes are susceptible."[3] When therefore variations in one direction are found to exceed those in the other, it is due to the causes operating in one direction having "much more probability than the contrary causes, either because they are more numerous or because they are more energetic."[4] When the observations are numerous, the skewness of their distribution becomes an indication of one or more causes more or less powerful, peculiarly favorable to variation in one direction. The normal distribution being viewed as natural, skewness requires special explanation.[5]

It should be noted that while Quetelet gave very great importance to the determination of the average, and the probable deviation from the average, he also frequently emphasized the importance of changes in the limits of variation. His reason for this emphasis was his belief that "one of the principal effects of civilization is that it more and more contracts the limits within which the different elements relating to man oscillate."[6] Believing the averages of human qualities to be for the most part stationary, he believed the perfectibility of man would be

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[1] Some discussion of the unsymmetrical distribution as related to the theory of the Average Man was given on p. 81, *et seq.*, *supra.*

[2] See *Letters*, p. 113.

[3] *Ibid.*, p. 106.

[4] *Ibid.*, p. 124.

[5] Bowley, *op. cit.*, p. 267.

[6] *Sur l'homme*, closing section; English translation, pp. x and 108; *Physique sociale*, vol. ii, p. 428; *Du Système social*, p. 252, *et seq.*

shown in an ever-increasing equality among men, physically, intellectually and morally, until all approached the state of the Average Man.[1] His interpretation of the narrowing of the limits of variation was thus very different from the more recent view which finds in such narrowing an evidence of a more intense struggle for existence, of more severe economic competition,[2] or of increased social pressure.[3]

Quetelet used the word "civilization" in the most general sense; its effects were shown in such phenomena as increased political equality, the prevention of famines and the general diffusion of a sufficiency of food, and the spread of knowledge through all classes. We may then note (1) that he centered attention upon the limits of variation from the type rather than upon the standard deviation of the group; it is the latter which shows best the massing of the group about the type, or the conformity to the type; (2) that he did not give an interpretation of restricted variation in terms of biological or sociological causation, nor does his statement in any way suggest the process of natural selection or increased environmental or social pressure as the explanation of the narrowed limits; and (3) from the sociological viewpoint social evolution (in order to avoid the term "civilization") seems to have resulted not only in an increased conformity of men to a type of individual capable of coöperation, but also in an increase of liberty, which implies greater freedom of variation.[4] The interpretation

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[1] For a discussion of Quetelet's confusion on this point see chap. iii, p. 72, *et seq.*, *supra*.

[2] H. L. Moore, "The Variability of Wages," *Political Science Quarterly*, March, 1907.

[3] F. H. Giddings, "The Measurement of Social Pressure," *Quarterly Publications of the American Statistical Association*, March, 1908.

[4] Giddings, *Sociology*, a lecture delivered at Columbia University in

of a statistical fact which Quetelet readily found in "one of the effects of civilization," is thus seen to be, sociologically, a difficult problem in balancing the effects of opposing and complex processes and conditions.

It remains to note Quetelet's classification of causes and his method of studying them. For besides making possible a more accurate description of social facts, Quetelet's principle of studying groups rather than individuals opened the way for the study of the causal relation among mass phenomena. Having described a group by means of the average and an index of variability, changes in these constants may be related to changes in the group conditions, that is, to causes sufficiently general to affect the whole or a large part of the group. The method itself thus suggests a classification of causes.

As to their manner of action, Quetelet classified causes as constant, variable or accidental.[1] He says:

> *Constant* causes are those which act in a continuous manner, with the same intensity and in the same direction. *Variable* causes act in a continuous manner, with energies and tendencies which change. . . . Among variable causes it is above all important to distinguish such as are of a *periodic* character, as for instance the seasons. *Accidental* causes only manifest themselves fortuitously[2] and act indifferently in any direction.[3]

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the Series on Science, Philosophy and Art, February 26, 1908, p. 34, *et seq.*, especially pp. 39–40.

[1] *Sur l'homme*, bk. iv, chap. ii; English translation, p. 103; "Sur l'appréciation, *etc.*," p. 207; *Letters*, p. 107.

[2] In *Du Système social*, pp. 305–306, he explains that he does not mean that any cause is really accidental. In using the term he merely follows established usage. The accidental causes are themselves necessary results of their antecedents, but are called accidental because we cannot trace these antecedents.

[3] *Letters*, p. 107.

Among constant causes Quetelet named sex, age, profession, season, latitude and economic and religious institutions. In the first place it may be noted that Quetelet interpreted social phenomena in terms of external and purely formal conditions. To-day we are interested in sex, age, profession as explanatory of social phenomena, only because of their implications with regard to human interests and mental traits. But it should not be overlooked that it is not possible to interpret social phenomena in terms of mental types until these types have been correlated with the external and formal conditions which Quetelet proposed. In the second place it may be doubted whether the above or any other causes are constant according to Quetelet's definition. He himself seems not to have been quite certain that really constant causes could be found.[1] Finally it should be recalled that Quetelet looked upon the average as the result of constant causes. It seems nearer the truth however to view the average as the final resultant of all causes, remembering that the more numerous the observations the more prominent become the effects of those causes which are most general in their influence. Since causes are appreciated through changes in the averages, perfectly constant causes must remain inscrutable. Our nearest approach to such causes in statistical inquiry will be general causes which are relatively constant.

Variable causes would seem to occupy a larger place in a satisfactory classification of causes than Quetelet gave them. Seasons appear in his discussion among both constant and variable causes. But if phenomena vary as we pass from one season to another, so do they as we pass from one age, sex, profession, or latitude to

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[1] *Letters*, pp. 133, 144.

another. It would seem in fact that all causes of social and organic phenomena, considered as mass phenomena, are more or less variable. Accepting the term then as a general characteristic of all such causes, we may find Quetelet's distinction of *periodically* variable causes highly useful. The seasons of the year and the hours of the day, or the revolution of the earth about the sun and its rotation on its axis, are of immense influence on organic life and in human affairs.

The theoretical characterization of accidental causes has already been given. In measurements of social and organic phenomena they include two quite different sets of influences. These are first the causes of accidental errors in counting or measuring, as carelessness, lack of skill or variations in the precision of instruments, and secondly the many minute causes of variations in the phenomena themselves resulting in a more or less symmetrical grouping about their average. Thus in ascertaining the average height of a group of men, there would be mingled both the causes of errors of measurement and the causes of differences in the heights themselves. That in both cases the causes are equal and act indifferently in favor of or in opposition to the average result is only a convenient hypothesis to be fully justified in every case only by experience. But the point to be noted here is that the causes of variability though relatively "feeble" and "indirect,"[1] are of varying degrees of feebleness and indirectness, depending upon the scope of the investigation. Thus in studying the heights of the men of a nation, the differences in race, age, place of habitation, nourishment, occupation would be merged together in the average. The group studied may how-

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[1] *Letters*, p. 130.

ever be steadily narrowed and each one of these conditions, which in the general study were deemed of minor importance, can be made most prominent. What is a minor cause for a wide group, becomes a general cause for a narrower group. There is of course a limit to this process of narrowing the group, for causes do not act singly, and with a very small group one condition cannot be sufficiently isolated—the number and variability of many small causes make the results too irregular.

It would seem then that in any given group the causes influencing the observations range in extent from the very minute causes affecting individual cases only, through relatively minute causes to those general causes which affect most or all members of the group. It is only the latter which can produce a change in the average. These are the causes whose effects become more pronounced as the observations increase, the effects of all others being at the same time neutralized. We may thus classify all social causes as variable, and as either minute or general in their influence.

Quetelet states that the art in the study of causes is to group the observations "in such a manner that all the causes, except those whose influence we wish to appreciate, may be considered as having acted equally on the members of each group."[1] If then differences in the results are found, they may be attributed to the influence studied. Thus he studied the relation of age, sex, season to the committing of crime by comparing the observations for one age, sex or season with those of another. This is in reality a study of causation through correlation or concomitant variation. With many measurements Quetelet held that accidental (or minor) causes

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[1] *Letters*, p. 131.

may be neglected, and the effects of constant (or general) causes will become prominent. The effects of periodic causes may be studied by comparing parts of a period, as one season with another, and may be avoided by embracing an entire period, as a year.[1] From this simple and general basis given by Quetelet, the difficult problem of studying causal relationships has been advanced to a method of quantitatively measuring the correlation of two variable elements throughout their distribution.

[1] *Letters*, p. 141.

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It does not seem necessary to give here a list of Quetelet's statistical publications, owing to the very thorough studies made by Georg Friedrich Knapp and published in Hildebrand's *Jahrbücher für Nationalökonomie und Statistik*, vol. xvii. Under the general title, "Bericht über die Schriften Quetelets zur Socialstatistik und Anthropologie," Knapp gives first a classification of these writings both by form and by subject matter (p. 167, *et seq.*), secondly a statement of their contents, the writings being divided into three chronological periods (p. 342, *et seq.*) and thirdly a selection of the more important passages for the presentation of Quetelet's views on many topics (p. 427, *et seq.*). It is only necessary to refer the interested reader to these studies for bibliographical material.

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